TRANSACTIONS

OF THE

American Therapeutic Society

ORGANIZED MAY 1, 1900

INCORPORATED JULY 7, 1904

Vol. 15 1915

EDITOR

A. ERNEST GALLANT

138767
15 | 6 | 16

PUBLISHED BY THE SOCIETY

COPYRIGHT, 1916,

BY

THE AMERICAN THERAPEUTIC SOCIETY

RM
1
A4
1915

CONTENTS

	PAGE
Officers	v
Members	vi
Deceased Members	ix
Constitution and By-Laws	x
List of Papers Read Before the Society, 1910 to 1915, inclusive	11
Obituary: Louis Kolipinski, M.D., by Noble Price Barnes	17
Scientific Proceedings	19
President's Address: Some Observations on the Present Status of American Medical Journalism, by Francis M. Pottenger	19
Complications and Sequellæ of Tonsil and Adenoid Infections, by Thomas C. McCleave	23
Discussion	31
Pyorrhœa Alveolaris: Its Treatment with Bacterins and Emetine Hydrochloride, by F. E. Stewart	32
Discussion	39
The Treatment of Muscular Rheumatism, by William Fitch Cheney	42
Discussion	49
An Instance of Potassium Iodide Poisoning, by Reynold Webb Wilcox	50
An Etiological Study of Asthma as a Basis for Treatment, by Bertram C. Davies	53
Discussion	58
The Sesamoids of the Flexor Brevis Hallucis, Their Importance, by Noble Price Barnes	59
Discussion	67
Thymic Disturbance in the Adult, by George H. Hoxie	68
Discussion	74
The Relation of Urobilin and Uric Acid Excretion Through the Urine in Some Metabolic Disturbances, by Gustav Baar	76
Longitudinal Inversion of the Colon, by Robert T. Morris	77
Colonic Stasis, by George H. Evans	79
Discussion of Papers of Doctors Morris and Evans	87
Visceral Stasis, Mechanical Obstruction, and Their Effects, Relievable by Rational Measures, by J. Madison Taylor	89
The Therapeutics of Angina Pectoris, by Robert H. Babcock	93
The Treatment of Cardiac Syphilis, by James M. Anders	98
Some Abnormal Cardiac Conductivities, by Thomas E. Satterthwaite	103
The Heart in Typhoid Fever and Its Treatment, by Ernest Zueblin	114
The Medicinal and Hygienic Treatment of Auricular Flutter, by Louis Faugeres Bishop	117
The Present Status of the Surgery of the Heart, by W. Wayne Babcock	122
Discussion of Cardiac Papers	135

OFFICERS, 1915-1916

President

ROBERT T. MORRIS,
616 Madison Ave., New York, N. Y.

Vice-Presidents

(1st) J. N. HALL, Denver, Colo.
(2d) F. C. E. MATTISON, Pasadena, Cal.
(3d) ALFRED C. CROFTON, Chicago, Ill.

Secretary

LEWIS H. TAYLOR,
The Cecil, Washington, D. C.

Treasurer

A. ERNEST GALLANT,
616 Madison Ave., New York, N. Y.

Council

Chairman	Noble P. Barnes (1916) 208 Maryland Ave., N. E.,	Washington, D. C.
Vice-Chairman	W. Wayne Babcock (1920)	Philadelphia, Pa.
Secretary	Lewis H. Taylor (1918)	Washington, D. C.
	Edward D. Fisher (1916)	New York, N. Y.
	A. Ernest Gallant (1916)	New York, N. Y.
	Alexander D. Blackader (1917)	Montreal, Can.
	James C. Wilson (1917)	Philadelphia, Pa.
	J. Madison Taylor (1917)	Philadelphia, Pa.
	Reynold Webb Wilcox (1918)	New York, N. Y.
	Spencer L. Dawes (1918)	Albany, N. Y.
	Thomas E. Satterthwaite (1919)	New York, N. Y.
	John Blake White (1919)	New York, N. Y.
	George Herbert Evans (1919)	San Francisco, Cal.
	William A. Campbell (1920)	Colorado Springs, Colo.
	Francis M. Pottenger (1920)	Monrovia, Cal.

Committee on Admissions

Thomas E. Satterthwaite, Chairman, 7 East 80th St., New York, N. Y. James C. Wilson George Herbert Evans

Editor of Transactions

A. Ernest Gallant, 616 Madison Ave., New York, N. Y.

ROSTER, JUNE, 1915.

1.	Aaron, Charles Dette	22 West Adams St.	Detroit, Mich.
2.	Anders, James M.	1605 Walnut St.	Philadelphia, Pa.
3.	Anderson, Harry Bertram	184 Bloor St., E.	Toronto, Canada
4.	Baar, Gustav	Broadway Bldg.	Portland, Ore.
5.	Babcock, Robert H.	311 Belden Ave.	Chicago, Ill.
6.	Babcock, W. Wayne	2033 Walnut St.	Philadelphia, Pa.
7.	Barbat, John Henry	275 Post St.	San Francisco, Cal.
8.	Barnes, Noble P.	208 Md. Ave., N. E.	Washington, D. C.
9.	Beates, Henry, Jr.	260 S. 16th St.	Philadelphia, Pa.
10.	Bishop, Louis Faugères	54 W. 55th St.	New York, N. Y.
11.	Blackader, Alex. Dougall	236 Mountain St.	Montreal, Canada
12.	Brown, Philip King	350 Post St.	San Francisco, Cal.
13.	Brown, Sanger Monroe	59 East Madison St.	Chicago, Ill.
14.	Camp, Carl Dudley	924 Baldwin Ave.	Ann Arbor, Mich.
15.	Campbell, William A.	424 N. Nevada Ave.	Colorado Springs, Colo
16.	Chappell, J. W.	3971 Grant Road	Washington, D. C.
17.	Cheney, William F.	Sheve Bldg.	San Francisco, Cal.
18.	Cohen, Solomon Solis	1525 Walnut St.	Philadelphia, Pa.
19.	Cole, C. E. Cooper	563½ Church St.	Toronto, Canada
20.	Croftan, Alfred C.	25 E. Washington St.	Chicago, Ill.
21.	DaCosta, John C., Jr.	1501 Spruce St.	Philadelphia, Pa.
22.	Davies, Bertram C.	Title Insurance Building	Los Angeles, Cal.
23.	Davis, N. S.	72 E. Madison St.	Chicago, Ill.
24.	Dawes, Spencer Lyman	255 State St.	Albany, N. Y.
25.	Eichberg, Julius H.	The Groton	Cincinnati, Ohio.
26.	Elsner, Henry L.	406 E. Genesee St.	Syracuse, N. Y.
27.	Evans, George Herbert	133 Geary St.	San Francisco, Cal.
28.	Fisher, Edward D.	46 E. 52d St.	New York, N. Y.
29.	Freeman, Elmer B.	330 N. Charles St.	Baltimore, Md.
30.	Freund, Hugo A.	355 Woodward Ave.	Detroit, Mich.
31.	Friedenwald, Julius	1013 N. Charles St.	Baltimore, Md.
32.	Friedman, Jacob	4653 Berlin Ave.	St. Louis, Mo.
33.	Gallant, A. Ernest	616 Madison Ave.	New York, N. Y.
34.	Gerrish, Frederic Henry	675 Congress St.	Portland, Me.
35.	Goodrich, Charles A.	5 Haynes St.	Hartford, Conn.
36.	Gompertz, Louis M.	1195 Chapel St.	New Haven, Conn.
37.	Gordinier, Herman C.	89 Fourth St.	Troy, N. Y.
38.	Gordon, Andrew R.	345 Bloor St., W.	Toronto, Canada
39.	Greene, Charles Lyman	150 Lowry Arcade	St. Paul, Minn.
40.	Grulee, Clifford Groselle	122 S. Michigan Ave.	Chicago, Ill.
41.	Hale, Henry Ewing	64 West 50th St.	New York, N. Y.
42.	Hall, Arthur J.	625 I St., N. W.	Washington, D. C.
43.	Hall, J. N.	Metropolitan Bldg.	Denver, Colo.
44.	Hare, H. A.	1801 Spruce St.	Philadelphia, Pa.
45.	Heard, James Delavan	6101 Penn Ave.	Pittsburg, Pa.
46.	Hemmeter, John C.	739 University Parkway	Baltimore, Md.
47.	Hitchens, A. Parker	Glenolden	Philadelphia, Pa.
48.	Hoxie, George H.	1334 Rialto Bldg.	Kansas City, Mo.
49.	Hunt, Charles Henry	673 Congress St.	Portland, Me.
50.	Jennings, Charles G.	437 Jefferson Ave.	Detroit, Mich.
51.	Johnson, Frank Seward	2521 Prairie Ave.	Chicago, Ill.
52.	Johnston, George Ben	405 E. Grace St.	Richmond, Va.
53.	Juettner, Otto	628 Elm St.	Cincinnati, Ohio
54.	Katsuki, J.		Honolulu, Hawaii

55.	Kemp, Robert Coleman	103 E. 57th St.	New York, N. Y.
56.	Kiliani, Otto G. T.	44 W. 77th St.	New York, N. Y.
57.	Kinyoun, J. J.	1434 Clifton St., N. W.	Washington, D. C.
58.	King, Alfred	610 Congress St.	Portland, Me.
59.	Leech, D. Olin	1237 Mass. Ave., N. W.	Washington, D. C.
60.	Long, Eli H.	1335 Main St.	Buffalo, N. Y.
61.	MacFarlane, Andrew	198 Washington Ave.	Albany, N. Y.
62.	Mattison, F. C. E.	Cham. of Commerce Bldg.	Pasadena, Cal.
63.	McCleave, Thos. Cooke		Berkeley, Cal.
64.	Milroy, William Forsythe	468 Brandies Bldg.	Omaha, Neb.
65.	Morgan, Francis P.	Toronto Apt.	Washington, D. C.
66.	Morris, Robert T.	616 Madison Ave.	New York, N. Y.
67.	Morton, William James	19 E. 28th St.	New York, N. Y.
68.	Osborne, Oliver Thomas	252 York St.	New Haven, Conn.
69.	Patterson, Ross V.	314 S. 16th St.	Philadelphia, Pa.
70.	Piersol, George Morris	1927 Chestnut St.	Philadelphia, Pa.
71.	Porter, William H.	46 W. 83d St.	New York, N. Y.
72.	Pottenger, Francis Marion	Title Ins. Building	Los Angeles, Cal.
73.	Reilly, Thomas F.	220 W. 139th St.	New York, N. Y.
74.	Richardson, James J.	1509 Sixteenth St.	Washington, D. C.
75.	Rottenberg, Ignatz M.	105 W. 118th St.	New York, N. Y.
76.	Roussel, Albert E.	2108 Pine St.	Philadelphia, Pa.
77.	Rudolf, Robert Dawson	302 Bloor St., W.	Toronto, Canada
78.	Ryan, Granville N.		Des Moines, Iowa
79.	Sajous, C. E. de M.	2043 Walnut St.	Philadelphia, Pa.
80.	Satterlee, George Reese	125 W. 58th St.	New York, N. Y.
81.	Sluder, Greenfield	3542 Washington Ave.	St. Louis, Mo.
82.	Satterthwaite, Thomas E.	7 E. 80th St.	New York, N. Y.
83.	Shoup, Jesse	2d and Md. Ave., N. E.	Washington, D. C.
84.	Sprigg, Wm. M.	1015 16th St., N. W.	Washington, D. C.
85.	Stern, Heinrich	250 W. 73d St.	New York, N. Y.
86.	Stewart, F. E.	11 W. Philellena St.	Germantown, Pa.
87.	Stockton, Charles H.	436 Franklin St.	Buffalo, N. Y.
88.	Taylor, John Madison	1504 Pine St.	Philadelphia, Pa.
89.	Taylor, Lewis H.	The Cecil	Washington, D. C.
90.	Theisen, Clement F.	172 Washington St.	Albany, N. Y.
91.	Thornton, Edward Linn	1331 Pine St.	Philadelphia, Pa.
92.	Van der Veer, Albert	28 Eagle St.	Albany, N. Y.
93.	Van Rensselaer, Howard	123 State St.	Albany, N. Y.
94.	Wheatley, Frank George	416 Huntington Ave.	North Abington, Mass.
95.	White, John Blake	1013 Madison Ave.	New York, N. Y.
96.	Wilcox, Reynold Webb	679 Madison Ave.	New York, N. Y.
97.	Wiley, Harvey W.	Cosmos Club	Washington, D. C.
98.	Wilson, James C.	1509 Walnut St.	Philadelphia, Pa.
99.	Wood, H. C., Jr.	434 S. 44th St.	Philadelphia, Pa.
100.	Zueblin, Ernest	Charles and Read Sts.	Baltimore, Md.

Please send corrections and changes of address to LEWIS H. TAYLOR,

Secretary, The Cecil, Washington, D. C.

Honorary Members

Brunton, Sir Lauder	London, England
Hayem, Georges	Paris, France
Marshall, C. R.	Dundee, Scotland
Schoeler, Heinrich	Berlin, Germany
Tillmanns, Hermann	Leipsic, Germany

Ex-Presidents

Horatio C. Wood	Philadelphia, Pa.	1900-1
Reynold Webb Wilcox	New York, N. Y.	1901-2
Thomas E. Satterthwaite	New York, N. Y.	1902-3
*Howard H. Barker	Washington, D. C.	1903-4
Oliver T. Osborne	New Haven, Conn.	1904-5
*Carl Beck	New York, N. Y.	1905-6
*Robert Reyburn	Washington, D. C.	1906-7
*John V. Shoemaker	Philadelphia, Pa.	1907-8
Frederic H. Gerrish	Portland, Me.	1908-9
James C. Wilson	Philadelphia, Pa.	1909-10
Harvey W. Wiley	Washington, D. C.	1910-11
Alexander D. Blackader	Montreal, Can.	1911-12
Noble P. Barnes	Washington, D. C.	1912-13
Howard Van Rensselaer	Albany, N. Y.	1913-14
Francis M. Pottenger	Los Angeles, Cal.	1914-15

*Deceased.

DECEASED MEMBERS.

Samuel Claggett Busey, M.D., LL.D., died Oct. 19, 1899.
William P. Manning, M.D., died Feb. 9, 1901.
John Thomas Winter, M.D., L.L.D., died June 22, 1902.
George Edward Tyler, M.D., died July 7, 1902.
Robert Henderson Graham, M.D., died Aug. 24, 1903.
George Bingham Fowler, M.D., died March 6, 1907.
John S. McLain, M.D., died June 2, 1907.
Robert Reyburn, M.D., died March 25, 1909.
Justin Steer, M.D., died June 20, 1909.
Howard H. Barker, M.D., died May 8, 1910.
John Veitch Shoemaker, M.D., died October 11, 1910.
Carl Beck, M.D., died June 8, 1911.
Henry Alfred Robbins, M.D., died October 26, 1911.
John Herr Musser, M.D., died April 3, 1912.
Louis Nelson, A.M., M.D., died April 14, 1912.
Frederick Forchheimer, M.D., died June 1, 1913.
Louis Kolipinski, M.D., died December 14, 1914.

CONSTITUTION AND BY-LAWS.

ARTICLE I.

This Society shall be known as the American Therapeutic Society.

ARTICLE II.

The object of this Society shall be the promotion of therapeutics in its broadest sense.

ARTICLE III.

This Society shall meet annually at such time and place as the Council may determine.

ARTICLE IV.

SECTION 1. The Officers of this Society shall consist of a President, three Vice-Presidents, a Secretary, a Treasurer, and a Council of fifteen members, all to be elected from the active membership, by ballot, at an annual meeting.

SECTION 2. The Council may be convened at any time by the Chairman, at the request of any three of its members. Its decisions shall be equivalent to acts of the Society, and shall be reported to it at the next regular meeting. The Council shall elect from its members a Committee on Admissions to consist of three members.

SECTION 3. A vacancy occurring in any office may be filled by the Council.

ARTICLE V.

SECTION 1. This Society shall consist of not more than one hundred active members. Honorary members may be elected on recommendation of the Council.

SECTION 2. Any qualified physician engaged in the general or special practice of medicine or surgery, or in laboratory research of interest in the treatment of disease, is eligible for membership.

SECTION 3. Applications for membership should be made in writing at least one month before the annual meeting. They are to be referred to the Committee on Admissions, which shall, on approval, present their names to the Society at the annual meeting. Five negative ballots shall reject an applicant.

SECTION 4. Applications for membership shall be accompanied by the annual dues for the ensuing year.

SECTION 5. Resignation of members shall not be accepted until all dues have been paid.

ARTICLE VI.

All proposed changes of the Constitution must be offered in writing at a regular meeting. They are to be considered only at an annual meeting, when a two-thirds vote of the members present shall be necessary for their adoption.

By-Laws.

I.

The *President* shall preside at the annual meeting of the Society, and deliver an address. He shall appoint a Committee on Scientific Business and a Committee of Arrangements.

In the absence of the President, one of the Vice-Presidents shall preside.

2.

The *Secretary* shall keep a record of the transactions of the Society and of its Committees, conduct all correspondence of the Society, and mail to each member a programme of the meeting, at least two weeks before it is held. The records, publications and seal of the Society shall be in his custody.

The *Treasurer* shall collect all moneys due the Society, disburse the same, as directed by the Council, keep a proper account of all his transactions, and render an annual statement to the Society. He shall have charge of all property belonging to the Society not otherwise provided for.

3.

Ten active members shall constitute a quorum for the transaction of business.

4.

SECTION 1. The *Council* shall constitute a standing committee to consider all matters of interest to the Society. It shall elect a Chairman, Vice-Chairman and a Secretary, and shall appoint an Editor of the Transactions.

SECTION 2. Three members of the *Council* shall be elected annually by the Society, each to serve five years.

SECTION 3. Five members shall constitute a quorum.

5.

The *Committee on Admissions* shall investigate the qualifications of applicants and report at the next annual meeting.

6.

Charges against any member must be made in writing. They shall be referred to the *Council* for investigation.

7.

No papers, report, abstract or other communication, either written or verbal, which, directly or indirectly, commends or advocates any secret, patented or trade-marked product or method of treatment shall be presented to or received by the Society; nor shall any discussion on such product or method be permitted.

Papers are limited to twenty minutes and discussions to five minutes.

8.

The *annual dues* shall be five dollars, payable in advance.

9.

The *order of business meetings* shall be as follows:

1. Reading of Minutes.
2. Reports of Officers and Committees.
3. Election of Members.
4. Presentation of Communications.
5. Miscellaneous Business.
6. Election of Officers.

PAPERS READ BEFORE THE SOCIETY.*

1910 to 1915 inclusive.

ANDERS, J. M.—What Constitutes a Useful Drug, and Shall the Preparations of a Useful Drug be Limited to One or two? Read by title. (*Monthly Cycloped. and Med. Bulletin,* Feb., 1911.) Obituary of Dr. J. V. Shoemaker (1911). Dioxydiamidoarsenobenzol in the Treatment of Various Clinical Forms of Syphilis (*Monthly Cycloped. and Med. Bulletin,* July, 1912). The Treatment of Cardiac Syphilis. Read by title (1915).

ANDERSON, H. B.—The Medical Treatment of Cholelithiasis (*Monthly Cycloped. and Med. Bulletin,* Nov., 1913).

BAAR, GUSTAV—The Relation of Urobilin and Uric Acid Excretion Through the Urine in Some Metabolic Disturbances. Read by title (1915).

BABCOCK, R. H.—The Therapeutics of Angina Pectoris. Read by title (1915).

BABCOCK, W. W.—The Range of Activity and the Untoward Effects of Certain Spinal Analgesics: Based on Two Thousand Administrations (1910). Uses and Limitations, of General Anesthesia as Produced by Subcutaneous and Intravascular Injections (*Monthly Cycloped. and Med. Bulletin,* Jan., 1912). The Dangers and Disadvantages of Spinal Anesthesia (*N. Y. Med. Journal,* Nov. 8, 1913). The Topical Employment of Tuberculin in Hydrocele and Other Serous Effusions, Tuberculous Adenopathies, and Chronic Sinuses (*N. Y. Med. Journal,* Nov. 14, 1914). The Present Status of Cardiac Surgery (1915).

BARNES, N. P.—Bacterins: Their Present Status in Therapeutics (1910). Filariasis: Report of a Case Treated with Dioxydiamidoarsenobenzol (*Monthly Cycloped. and Med. Bulletin,* Jan., 1913). Presidential Address (*Monthly Cycloped. and Med. Bulletin,* Oct., 1913). Obituary of Dr. Louis Kolipinski. The Sesamoids of the Flexor Brevis Hallucis, Their Importance. A Surgical Precaution (*N. Y. Med. Journal,* Nov. 6, 1915).

BARTON, W. M.—Hexamethylenamine in the Treatment of Otitis Media (1910). Copper Chemotherapy, with Especial Reference to the Double Tartrate of Copper Oxide and Sodium (*Monthly Cycloped. and Med. Bulletin,* Nov. and Dec., 1913). A Case of Post-Diphtheritic Paralysis Apparently Cured by Sixty Thousand Units of Antitoxin. Read by title (*N. Y. Med. Journal,* Oct. 3, 1914).

BEATES, H., JR.—Some Fundamental Principles in Digitalis Therapy. Read by title (*Monthly Cycloped. and Med. Bulletin,* Sept., 1912).

BECK, C.—On Morbus Basdowi. Read by title (1910).

BEEBE, S. P.—The Preparation of Thyroid Gland for Use (1910).

BISHOP, L. F.—The Treatment of Arteriosclerosis (*Monthly Cycloped. and Med. Bulletin,* Aug., 1913). Digitalis in Chronic Disorders of the Heart, with Special Reference to the Advisability of its Continuous Administrations (*N. Y. Med. Journal,*

---

* For list of papers read before the Society from its organization to the year 1909, inclusive, see the *Transactions* for 1909.

Aug. 29, 1914). The Medicinal and Hygienic Treatment of Auricular Flutter. Read by title (1915).

BLACKADER, A. D.—Presidential Address (*Monthly Cycloped. and Med. Bulletin*, Aug., 1912).

BLAKE, C. J.—Obituary of Dr. Louis Nelson (1912).

BOOS, W. F.—The Newer Heart Remedies (1911).

BROWN, P. K.—A Modified Vaccine Therapy in Pneumonia; with Animal Experiments (1911).

CHENEY, W. F.—The Treatment of Muscular Rheumatism (1915).

COHEN, S. S.—What Unofficial Drugs are of Sufficient Clinical Value to be Recognized in the U. S. Pharmocopœia of 1910? Read by title (1910). Recent Improvements in the Quinine Treatment of Lobar Pneumonia (*Journal of Amer. Med. Association*, July 12, 1913).

CROFTAN, A. C.—The Nature of the Cardiovascular Changes in Nephritis (*Monthly Cycloped. and Med. Bulletin*, Sept., 1912).

CROTHERS, T. D.—The Delusion of the Stimulant and Tonic Effects of Alcohol (*Monthly Cycloped. and Med. Bulletin*, July, 1911).

DACOSTA, J. C., JR.—The Routine Use of the Autogenous Vaccines (Bacterins) in the German Hospital, Philadelphia (1910).

DAVIES, B. C.—An Etiological Study of Asthma as a Basis for Treatment (*Interstate Med. Journal*, XXII, 11, 1915).

DAVIS, N. S.—Should the Pharmacopœia Contain Only Useful and Efficient Drugs? (*Monthly Cycloped. and Med. Bulletin*, Feb., 1911).

DAWES, S. L.—The General Treatment of High Blood-Pressure (*Monthly Cycloped. and Med. Bulletin*, Dec., 1912).

EVANS, D. J.—High Blood-Pressure in the Toxemias of Pregnancy (*Monthly Cycloped. and Med. Bulletin*, Nov., 1912).

EVANS, G. H.—Climatic Conditions in California, and their Influence in the Treatment of Tuberculosis (*Monthly Cycloped. and Med. Bulletin*, Sept., 1913). Colonic Stasis (1915).

FISHER, E. D.—Senile Epilepsy (*Monthly Cycloped. and Med. Bulletin*, Sept., 1910). General Paresis, Tabes, and Cerebrospinal Syphilis. Read by title (*Monthly Cycloped. and Med. Bulletin*, 1912). High Blood-Pressure Arising from Nervous Strain in Diseases of the Nervous System (*Monthly Cycloped. and Med. Bulletin*, Oct., 1912). Dioxydiamidoarsenobenzenemonomethane Sodium Sulphate in Syphilis of the Nervous System (1913).

FLICK, L. F.—Skin Inunctions as a Therapeutic Measure. Read by title (*Monthly Cycloped. and Med. Bulletin*, Aug., 1910).

FREEMAN, E. B.—Treatment of Splanchnoptosis; with Report of Cases (1913).

FRIEDENWALD, J.—The Effect of Scarlet Red in the Treatment of Ulcer of the Stomach and Duodenum (*Monthly Cycloped. and Med. Bulletin*, June, 1913).

FUSSELL, M. H.—Further Consideration of the U. S. Pharmacopœia. Read by title (*Monthly Cycloped. and Med. Bulletin*, March, 1911). Obituary of Dr. J. H. Musser (1912).

GALLANT, A. E.—The Delayed Menopause: Its Dangers and Therapeutic Indications (*N. Y. Med. Journal*, June 18, 1910). Panhysterocolpectomy for Hernia Vaginæ (*Monthly Cycloped. and Med. Bulletin*, Dec., 1911). The Therapeutics of Sacro-iliac Relaxation as a Sequel to Surgical Operations (*Monthly Cycloped. and Med. Bulletin*, Feb., 1913). Prolonged-Precipitate Parturition Due to Disengagement of the Disproportionate Head (*Med. Record*, Aug. 23, 1913). Continuous Uterine Drainage: A Résumé of 250 Cases of Intermenstrual Plus Intramenstrual Obstruc-

tions (*N. Y. Med. Journal,* Oct. 10, 1914). An Improved Ether Inhaler (*N. Y. Med. Journal,* Oct. 31, 1914).

GOMPERTZ, L. M.—Medical Treatment of Gastric and Duodenal Ulcer (*Monthly Cycloped. and Med. Bulletin,* March, 1913).

GORDINIER, H. C.—Chronic Acetanilide Poisoning a Perfectly Definite Symptom-Complex (*Monthly Cycloped. and Med. Bulletin,* 1912).

HEMMETER, J. C.—Hyper- and Hypotonicity of the Vagus and Sympathetic Nervous System; Neurochemical Synergism of the Normal Body and its Suggestions for Physiological Therapeutics (*N. Y. Med. Journal,* Jan. 17, 1914).

HITCHENS, A. P.—A Discussion of Current Developments and Problems in Vaccine Therapy (*Monthly Cycloped. and Med. Bulletin,* Oct., 1913).

HOXIE, G. H.—Thymic Disturbance in the Adult (*N. Y. Med. Journal,* ————, 1915).

HUGHES, L. F.—Obituary of Dr. Justin Steer (1911).

JUETTNER, O.—Obituary of Dr. F. Forchheimer (*N. Y. Med. Journal,* Aug. 8, 1914).

KEBLER, L. F.—The Present Status of Drug Addiction in the United States (*Monthly Cycloped. and Med. Bulletin,* Jan., 1911).

KING, A.—Further Study of Diabetes as an Infectious Disease (*Monthly Cycloped. and Med. Bulletin,* July, 1910). Diabetes Mellitus from a Surgical Standpoint (*Monthly Cycloped. and Med. Bulletin,* Aug., 1911).

KIRK, W., JR.—Auricular Fibrillation: Its Diagnosis and Treatment (1914).

KOPLINSKI, L.—Further Use of Solution of Calcium Creosote in Medicine (*Monthly Cycloped. and Med. Bulletin,* Aug., 1910; June, 1911). On the Uses of Nickel Sulphate in Medicine (*Monthly Cycloped. and Med. Bulletin,* June, 1911). The Proper Dietetic Treatment of Diabetes Mellitus (*Monthly Cycloped. and Med. Bulletin,* Aug. and Sept., 1912). The Treatment of Pneumonia with Mercury and Sulphur Internally (*Monthly Cycloped. and Med. Bulletin,* July, 1913). Cardiac Headache: Description and Treatment (*N. Y. Med. Journal,* Aug. 1, 1914).

LARRABEE, R. C.—The Treatment of Leukemia with the Mixed Toxins of Coley (1911).

LEECH, D. O.—Obituary of Dr. H. H. Barker (1911).

LONG, E. H.—The Metric System. Read by title (*Monthly Cycloped. and Med. Bulletin,* March, 1911).

MCCLEAVE, T. C.—The Complications and Sequelae of Tonsil and Adenoid Infections (1915).

MCPHEDRAN, A.—Treatment of Pneumonia (*Monthly Cycloped. and Med. Bulletin,* June, 1910).

MORGAN, F. P.—Suggestions for the Pharmacopœia of 1910: A Brief Consideration of the Subject in its Relation to the Federal Food and Drugs Act (*Monthly Cycloped. and Med. Bulletin,* March, 1911). Alleged Tuberculosis Cures upon the Market (*N. Y. Med. Journal,* Oct. 31, 1914).

MORRIS, R. T.—Surgery of the Obese. Read by title (*Monthly Cycloped. and Med. Bulletin,* 1910). Epithelial Conductors and Obstructors (*Monthly Cycloped. and Med. Bulletin,* Aug., 1911). Newer Notes on the Subject of Peritoneal Adhesions (*Monthly Cycloped. and Med. Bulletin,* Sept., 1913). Non-Operative Treatment of Tuberculous Neck Glands (*N. Y. Med. Journal,* Oct. 3, 1914). Longitudinal Inversion of the Colon (1915).

MORTON, W. G.—Note on Fluorescence Excited Within Human Tissues as a Method of Treatment (*Monthly Cycloped. and Med. Bulletin,* Nov., 1911).

NAGLE, E. W.—Some Observations on Vaccine Therapy (*Monthly Cycloped. and Med. Bulletin,* June, 1911).

Osborne, O. T.—U. S. P., 1910. How May It be Constructed? (*Monthly Cycloped. and Med. Bulletin,* Jan., 1911). Common Types of Thyroid Hyposecretion (*Journal of Amer. Med. Association,* 1912). The Absurdities and the Commercialism of the Proposed Ninth Decennial Revision of the U. S. Pharmacopœia (*Journal of Amer. Med. Association,* 1913).

Porter, P. B.—The Tuberculosis Home Hospital Experiment (*Amer. Medicine,* Sept., 1914).

Porter, W. H.—Sodium Nitrite in Arterial Hypertension (*Monthly Cycloped. and Med. Bulletin,* Feb., 1913). The Acquisition of Tuberculosis (*Amer. Medicine,* Sept., 1914).

Pottenger, F. M.—Some of the Factors which Alter Blood-pressure in Pulmonary Tuberculosis (*Monthly Cycloped. and Med. Bulletin,* Oct. 1912). What Does Treatment Offer to the Advanced Tuberculous Patient? (*Monthly Cycloped. and Med. Bulletin,* Oct., 1913). Presentation of a Case of Tuberculosis, Third Stage, with Healed Lesions of the Tongue and Larynx (1914). Presidential Address (*California State Journ. Med.,* Sept., 1915).

Reilly, T. F.—Parageusia and Its Treatment (*N. Y. Med. Journal,* Nov. 28, 1914).

Remington, J. P.—Revision of the United States Pharmacopœia (*Monthly Cycloped. and Med. Bulletin,* Feb., 1911).

Ross, G. G.—A Case of Recurrent Abscess Formation, Due to Staphylococcus Infection, Successfully Treated by Autogenous Vaccines. Read by title (*Monthly Cycloped. and Med. Bulletin,* Sept., 1910).

Roussel, A. E.—Pulmonary Syphilis, with Report of a Case Promptly Responding to Specific Treatment (*N. Y. Med. Journal,* Sept. 27, 1913).

Rudolf, R. D.—Effects of Medicinal Doses of Aconite upon the Pulse Rate. Read by title (*Amer. Journal of Med. Sciences,* Dec., 1912).

Russell, F. F.—Antityphoid Inoculations (1913).

Sajous, C. E. de M.—Acute Hypoadrenia as a Cause of Death, and Its Treatment (*Monthly Cycloped. and Med. Bulletin,* Dec., 1911). The Relation Between High Blood-Pressure and the Adrenals (*Monthly Cycloped. and Med. Bulletin,* April, 1913).

Satterlee, G. R.—Diseased Conditions of the Cecum (*N. Y. Med. Journal,* Oct. 31, 1914).

Satterthwaite, T. E.—High Frequency Currents in the Treatment of Arteriosclerosis (*Med. Record,* July 2, 1910). Malignant Endocarditis in New York City: A Clinical Study (*Med. Record,* July 15, 1911). Notes on the Differentiation of Cardiac Arrhythmias and Their Treatment, with a New Time Marker (*Monthly Cycloped. and Med. Bulletin,* March, 1913). A Case of Influenzal Meningitis in the Adult Complicated by Pneumonia—Recovery (*N. Y. Med. Journal,* May 24, 1913). Some Problems in Genetics (*Med. Record,* July 25, 1914). Some Abnormal Cardiac Conductivities. Read by title (*Medical Times, N. Y.,* Feb., 1916).

Sears, C. E.—The Relation of Intestinal Stasis to Appendicitis (1915).

Shook, F. N.—The Malarial Infections and Their Treatment in the Canal Zone (*Monthly Cycloped. and Med. Bulletin,* June, 1910).

Shoup, J.—Immediate and After Management of the Puerperant (*Monthly Cycloped. and Med. Bulletin,* Oct., 1910).

Sprigg, W. M.—Obituary of Dr. H. H. Barker (1911).

Stewart, F. E.—Some Points in Bacterial Therapy (*Monthly Cycloped. and Med. Bulletin,* Oct., 1910). Dioxydiamidoarsenobenzol as a Patented Product (*Monthly Cycloped. and Med. Bulletin,* Sept. and Oct., 1911). Modern Methods of Drug Standardization (*Monthly Cycloped. and Med. Bulletin,* Jan., Feb. and March, 1913). The Application of Some Muscular Tissue Adapted tc Physiological Standardization

(*Monthly Cycloped. and Med. Bulletin,* Sept., 1913). The Application of Some Muscular Tissues Adapted to Physiological Standardization. Standardization of Ergot and Pituitary Preparations. Continuation of a Previously Reported Study (*Monthly Cycloped. and Med. Bulletin,* July, 1914). Pyorrhœa Alvoelaris: Its Treatment with Bacterins and Emetine Hydrochloride (*N. Y. Med. Journal,* Aug. 7, 1915).

TAYLOR, J. M.—Some Principles in the Treatment of Chronic Nervous Diseases. Read by title (1910). Remarks on the Treatment of Chronic Disease (*Monthly Cycloped. and Med. Bulletin,* 1912). Treatment of High Blood-Pressure by Manual Methods, Regulated Movements, and Neutral Immersion Baths (1912). Orthotherapy: The Power Which Correct Position, Organic Adjustments, and Mobility Exert Upon Health and Recovery (*Monthly Cycloped. and Med. Bulletin,* Jan., 1914). Viscerad Stasis, Mechanical Obstructions and Their Effects, Relievable by Rational Measures. Read by title (*N. Y. Med. Journal,* July 31, 1915).

TAYLOR, L. H.—The Value of Enterostomy in Ileus (*Monthly Cycloped. and Med. Bulletin,* July, 1912).

THEISEN, C. F.—Normal Horse Serum in Hemorrhage from Nose and Throat Operations (*N. Y. Med. Journal,* Oct. 31, 1914).

VAN RENSSELAER, H.—The High-Frequency Current in the Treatment of High Blood-Pressure (*Monthly Cycloped. and Med. Bulletin,* Nov., 1912). Presidential Address (1914): Therapeutic Effects of Thermopenetration in Phthisis Pulmonalis.

WHITE, J. B.—Important Therapeutic Indications in the Treatment of Typhoid Fever (1910). Hypodermic Medication: Its Advantages and Technique (1911).

WILCOX, R. W.—The Treatment of Leukæmia by the Röntgen Ray (*Monthly Cycloped. and Med. Bulletin,* July, 1910). Treatment of Chronic Universal Perihepatitis (*Monthly Cycloped. and Med. Bulletin,* July, 1911). Note on the Treatment of Gastric Neuroses (*Monthly Cycloped, and Med. Bulletin,* Nov., 1912). Obituary of Dr. Carl Beck (1912). The Treatment of Diabetes and Pregnancy (*Monthly Cycloped. and Med. Bulletin,* July, 1913). The Medical Treatment of Intestinal Stasis (*N. Y. Med. Journal,* Sept. 26, 1914). An Instance of Potassium Iodide Poisoning. Read by title (1915).

WILEY, H. W.—President's Address: Bromatotherapy (*Monthly Cycloped. and Med. Bulletin,* July, Sept., Oct., and Nov., 1911).

WILLIAMS, T. A.—The Treatment of "Parasyphilis" of the Nervous System in the Light of Recent Research: Paresis and Tabes Dorsalis (*Monthly Cycloped. and Med. Bulletin,* Dec., 1910). The Radical Removal of the Conditions Causing Arterial Changes Leading to Non-Psychogenic Disturbances of the Nervous System. Read by title (*Monthly Cycloped. and Med. Bulletin,* Dec., 1911).

WILSON, J. C.—President's Address: The Progress of Therapeutics (*Monthly Cycloped. and Med. Bulletin,* June, 1910).

ZUEBLIN, E.—Volatile Substances Isolated from Tubercle Bacilli Cultures, and Their Effects on Experimental Tuberculosis (*Amer. Medicine,* Sept., 1914). The Action of Lecithen Upon Tubercle Bacilli, and Its Relation to Experimental Tuberculosis (*Boston Med. and Surg. Journal,* Dec. 10, 1914). The Action of Pituitrin Upon Acute Heart Failure and Incompensate Heart Lesions (*Boston Med. and Surg. Journal,* Dec. 17, 1914). The Heart in Typhoid Fever and Its Treatment. Read by title (1915).

LOUIS KOLIPINSKI

BY NOBLE P. BARNES, M.D.,

WASHINGTON, D. C.

"Greater love than this hath no man that he died that others might live."

Broken in health from the burdens of an unusually busy life, Louis Kolipinski, physician, surgeon, author and philanthropist, while in the active pursuit of his mission was summoned to "join the innumerable caravan * * * in the silent halls of death." Thus, after years of service to his fellow-creatures, this untiring worker came to his heroic end.

His, was the larger life—the life that crams years into months and months into days. The busy practitioner, the scientific investigator, the literary student, the teacher, the writer, the organizer, the welfarer, the husband, and the father of a well provided family; these, were the attributes of a life summed up in one expression—my best endeavor.

Louis Kolipinski was born in the capital city November Third, 1859. Twenty years later he graduated from Gonzaga College, receiving the class medal for proficiency in classical studies.

In 1880 he also graduated from the National College of Pharmacy and was given honorable mention for his work in chemistry.

In 1883 he was graduated from the Medical Department of the Georgetown University and was given the gold medal and other student distinctions.

He pursued the study of his chosen profession in the medical centers of the old world and on his return to Washington was made resident physician at Children's Hospital.

In 1884 he became a licentiate of the District Medical Society and was elected to membership October 7th, 1885.

In the early Nineties he was elected to the faculty of the Medical Department of the National University and was its Professor of Surgery for five years.

Doctor Kolipinski's interests, however, centered more especially upon non-surgical therapy, that department of medicine that had been outstripped by the strides in the collateral branches. Therapeutics became his favorite study, in fact his hobby.

That he was an unceasing worker, a thinker and a writer is attested by the thirty or more original contributions to medical literature re-

corded in the index catalogue of the Surgeon General's library, all of which were produced at the expense of the midnight oil that burns too rapidly the vitals of the restless enthusiast.

Thus, Kolipinski, possibly the busiest of men, with possibly the largest clientele of his day, leaves one undebatable lesson to his professional brothers:—dead from overwork, on December 15th, 1914, at the age of fifty-five years.

In his last act to relieve a suffering fellowman he responded preparedly to his last call.

This was his life and this, his end. Rich and poor he served alike and his departure was mourned by hundreds of his followers. The throng that wept this man to his grave were devoted patients whose grief was genuine. As many poor, grief-stricken women and men pressed eagerly forward to gently caress the flowers that mantled his bier, one could not but think of the faith akin to the penitent Magdalen who touched but the hem of His garments. One could not but feel deeply this expression of simple faith, love, devotion and grateful admiration.

SCIENTIFIC PROCEEDINGS*

PRESIDENT'S ADDRESS

Some Observations on the Present Status of American Medical Journalism.

BY FRANCIS M. POTTENGER, A.M., M.D., LL.D.,

MONROVIA.

The importance of an effective American medical journalism which shall stimulate the best effort of our own American profession and afford an opportunity for recording our own best thought, and, at the same time, keep before our profession the advances that are being made in the entire medical world, cannot be overestimated. The strength of our profession and the progress it shall make depend largely upon its literature. While our American profession is young and not yet established upon the stable conservative basis of our European confreres, yet it has much to be proud of. The pages of medical history bear the imprint of many men from this side of the Atlantic; and at no time has our profession been so active as now. The fact that we are not conservatively settled is to our advantage, rather than disadvantage. While we may envy the comfortable, honorable position occupied by our confreres in Europe, and envy the position which they have established for themselves through centuries of toil and service, yet we must not be unmindful of the fact that our very freedom, the fact that we are comparatively unbound by tradition and that we are in the making as a scientific profession is to our advantage.

---

*It is to be understood that the Society does not hold itself responsible for any views expressed by the readers of papers or participants in discussions.

During recent years our profession has been undergoing important changes. It has been demanding higher standards of scholarship and stricter requirements of its members. The public at large has put us on trial to prove that we are worthy of and able to hold its confidence. With the high standards of efficiency that we have set for ourselves, and the demands which are being made upon us by the public, our profession need have no fear. Its future is secure. When one reviews the genuine advances which the past twenty-five years have added to our scientific knowledge, he is forced to recognize that our science today is as different from medicine of the seventies and eighties of the last century as the adult is from the child. Fortunately for those of our profession who live today they are engaged in the study of medicine at the time of its greatest development. The accomplishments of today, however, are based on the knowledge of the past and workers must not be unmindful of what has been done by the pioneers of previous centuries; but with the glorious heritage coming to us from our faithful predecessors, it is our privilege, as well as our duty, to gradually and systematically build a structure of scientific medicine where every stone used in the building has been subjected to tests which have been proven by many careful, independent workers.

American medical journalism records the events which lead up to and took place during the building of America's scientific medicine. Therefore it must be accurate, complete and efficient in that it keeps every group of workers in touch with what is being done by every other group.

Any one who has had editorial experience realizes his limitations in attempting to pass upon the merits of papers which are submitted to him, covering as they do all branches of medicine. Many papers add nothing new to the discussions of known scientific facts, nor do they add new observations; and medical literature would be just as rich without them. There are others, however, which may contain important facts and yet they may not appeal to the editor, and be rejected.

Medical journals are not wholly for the original investigator. They are for the purpose of bringing the work of the original investigator to the members of the profession at large; for establishing truth and rejecting error; and, for discussing and making plain the application of facts. It is only by constant repetition that we learn. We read a scientific article and obtain a certain number of facts and a certain amount of stimulation from it. Later we read it again, and later still again, and each time wonder why we overlooked so much truth in our previous readings. So discussions are as necessary a part of medical literature as the reporting of the original facts. By recording his own thoughts and experiences even without adding new facts one is helping others to understand principles which would otherwise escape them. How far

medical journals can allow free expression of opinion without appearing to foster error is open to question. The editor's position is a difficult one. He is supposed to be able to differentiate the good from the bad and yet he is only able to see things from his own standpoint. If he rejects good work the author is discouraged; on the other hand, if he lets a bad article appear, readers may be led into error.

American medical journalism today is in a very unsatisfactory condition. It is in a state of transition. A few years ago the self-respecting members of our profession began to take stock and found that they were in a deplorable state as far as medical education and medical journalism were concerned; medical schools were largely private concerns depending on tuition of students for maintenance; and, there being no set standards, preliminary training and scholarship were of little concern compared with the fact that the students matriculated and met the monetary requirements of the school. From this chaotic state has emerged in the short space of twenty years a strong medical curriculum based on a preliminary training, and a demand upon schools for equipment which has forced them into large universities. So, today medical education in the United States is fast becoming not only an honor to our profession but an honor to the state.

A few years ago we had a number of independent medical journals—journals which were published largely by medical book publishers. These journals had been established for two purposes: one the encouragement of medical writing, and the other the furtherance of the interests of the publishers. The purpose of these journals was not questioned, neither was their value to the profession doubted until a comparatively recent date. The spirit of commercialism which has been so rampant in all industries gradually assumed greater and greater force in our medical journals. Realizing the value of journals as mediums of publicity, manufacturing concerns which presumably served only the interests of medical men, gradually gained complete control over medical publications. This they did largely through the advertising pages. It is not necessary to doubt the honesty of all commercial houses, for many of them were honest in their efforts to serve the profession and the public, and were willing to take as their reward the legitimate profit from the sale of their products. Others, however, were less scrupulous and resorted to undignified and questionable methods.

The acts of certain commercial drug houses became especially obnoxious. Page on page of advertisements could be found in nearly every journal exalting the claims of some special preparation, and teaching false therapeutics at so much per line. This was followed up by smooth tongued detail men who entered the office of the physician and, with an assumed superior knowledge, presumed to argue with him as to the

merits and demerits of certain therapeutic measures. Even the medical profession at last became aroused to the extent of the insult.

American medicine, while no less interested in the fundamental principles of our science, has always aimed at improving its therapeutic measures. This is the principle upon which the American Therapeutic Society is based. Therapeutic nihilism is neither acceptable to the American public nor to the American profession. Our profession refuses to occupy the position as coroner to the public and to recognize that its chief role is to determine the cause of death. Its aim is to alleviate suffering and apply curative measures. If it cannot do this it has no claim to the confidence of the public except in its efforts to prevent disease. In its effort to teach therapeutics it needs and must have an efficient, independent journalism.

The selling of advertising space, while legitimate, has a tendency to lower dignity and might even influence the selection of papers and the character of the journals. There can be little real improvement, until there is a general understanding of the functions of medical journals; until it is recognized that they are media for the education of the medical profession and not for supplying it with questionable information or earning money. Needless to say, however, every respectable journal should have earning capacity sufficient to pay all expenses of conducting it on a high plane.

We have at the present time too many medical journals, such as they are, but entirely too few that can be considered as worthy of our profession. They may be classed under the following heads: The privately-owned journal conducted for profit primarily and medical education secondarily; the privately-owned journal conducted from altruistic motives; the journal which is the organ of some society and whose purpose is the furthering of the interests of that society primarily and medical education secondarily; the organ of some medical institution whose primary purpose is to publish the work done in that institution, together with other papers along similar lines; and the purely scientific journal, representing no particular set of workers and depending on the support of scientific workers in general for its success. All of these journals may be good journals and do untold good for medicine. Some of them are largely dependent upon advertising, while others are wholly free from its influence. Under existing conditions the question of whether or not a journal of a certain type can be successfully published is not a question of whether such a journal is needed, but can it draw sufficient advertisements to make its publication a monetary success?

It is a self-evident fact that paid advertisements occupy too important a place in medical journalism. Can it be that a great profession like ours cannot place its new discoveries and its general scientific discussions before its members except through the profit from advertising

space? If such is the case then it is all important that such advertisements be carefully scrutinized so that none that are unworthy appear.

The work that is being carried on by the American Medical Association in the interest of clean advertisements is commendable. But alas! How few other journals follow its lead? How many from the financial standpoint can afford to do so as long as advertisers must pay for our privilege of obtaining medical facts? If we view ourselves in the true light we are in the following plight: We obtain our scientific medical facts through our journals simply because commercial houses see fit to drop their contributions into the basket. We will no longer smile upon privately owned medical schools because we desire to breathe the pure air of freedom and efficiency; but after we have had our college training we send solicitors to beg private concerns to contribute to the advertising columns of our journals so that we may have the privilege of continuing our education. The result of this is that while the parent journal, the Journal of the American Medical Association, has sufficient patronage from clean, censored advertisements to make it self-sustaining, many of its own children, the journals of the state associations, to a large degree, still serve their readers by paid advertisements of uncensored products. While the parent is able to feed its readers on certified milk, the children are compelled to serve their readers not only with uncertified, but unpasteurized milk; milk uncontrolled in every stage of its production.

What is the remedy? Far be it from me to offer an easy way out of this difficulty. But it seems certain that no definite headway can be made in the final establishment of an efficient scientific medical journalism until a maintenance independent of advertisements is provided. This may be looking too far in the future for present-day consideration, but it is logical.

The first step in that direction is to recognize that there is a difference between journals for organization and journals for teaching scientific medicine. The second step is to divorce scientific journals from their dependence on advertisers and make them self-sustaining, either through an adequate subscription price or through endowments. Science should be separated from business.

I do not wish to be understood as criticizing individual journals as they now exist or have existed in the past, but I do desire to point out the need, as I see it, for relieving the present unsatisfactory state of our affairs. The Journal of the American Medical Association and the journals of many of our state associations are a credit to the profession and are doing good work in the organization and teaching of scientific medicine; but no one can give more than a passing glance to the situation without seeing that our American profession cannot be dependent upon these for their scientific education. These journals are, and should be, partly

scientific in their nature but they can never fully serve the needs of the American profession in scientific medicine; for their first function is to promote organization and improve the condition of medical men as a body. We need these journals for organization; but, aside from them, we need both general and special journals of national circulation and national interest, which, as they come to our table, will represent the best scientific work that is being done in all sections of the country. No one journal can do this, for the acquaintanceship and influence of every editor or editorial board is more or less circumscribed; but the field should be so well covered that, by taking several journals, the subscribers can keep abreast of the present state of medical science.

These journals should be different in their scope, as they are bound to be from the fact that they are edited by different men and controlled by different influences. Some should be ultra-scientific; others should lean more to general discussions. There is need for both. We also need journals such as are commonly found on the Continent in which a complete discussion of disputed subjects is printed. America heretofore has largely demanded practical papers; but, as our profession grows older, it finds that, as there can be no cream without milk, so practical subjects have facts no less important underlying them.

The philosophical discussion of medical subjects, the bringing of anatomy, physiology, bacteriology and pathology into constant, close relationship with clinical medicine, is necessary if we desire to grow as a profession. This should be encouraged more and more in this country. The short practical paper must be supplemented by complete fundamental discussions. It cannot be done unless we have journals which will encourage the writing of such papers. Monographs are the best part of Continental medical literature, and their development in our country would be encouraged if we had journals which would publish papers of length. There is a great gap in our medical literature between the text-book, which, while necessary as a guide, is too conservative to be more than a guide; and the practical papers which appear in the average journal, telling a supposed fact or experience, free from all scientific discussion. This gap can be filled by monographs, and journals whose pages are open to such papers are needed in all branches of medicine.

By linking scientific medicine so closely to medical organization we have appeared to make it subsidiary and in this manner have brought it under unjust criticism. The triumph of scientific medicine has been minimized because of opposition to organization and the science itself has been put on the defensive. The two should be divorced and scientific medicine should become a positive aggressive factor and take its place, against all opposition, in the front ranks of the world's mighty forces for good. It may be retarded, its influence may be, for a time, curtailed, but eventually it will come into its own regardless of opposition.

THE COMPLICATIONS AND SEQUELÆ OF TONSIL AND ADENOID INFECTIONS.

BY THOMAS C. McCLEAVE, M.D.,

OAKLAND, CALIFORNIA.

The abundant literature on the tonsils and adenoids emanates so largely from laryngologists as to imply that these structures are of peculiar concern to specialists in diseases of the nose and throat. That this is not so indicated by the increasing evidence of the role of tonsils and adenoid disease in the causation of extensive systemic disturbance and of pathological conditions in apparently remote organs and structures.

Symptomatic hypertrophy of adenoids occurs in from twenty-five to thirty-five per cent. of all children between the ages of three and ten years, and the characteristic facial appearance of the typical case is such that for cosmetic reasons alone it should warrant attention. This is, however, the least of the indications for operative treatment, for even the laity is familiar with the evil influence of adenoids upon physical and mental development and vigor.

Nutritional disturbances are frequently the earliest manifestation of tonsil and adenoid disease. In a puny, sickly child, refusing to eat and steadily declining in vigor, examination may reveal only a small adenoid, and tonsils apparently insignificant, except that they are submerged. To the inexperienced in this type of case these findings may appear negligible, but after operation, often within a few weeks, many such children are transformed to buoyant health.

In another instance, a child previously well and strong, begins to decline without apparent reason. There may be a history of recent mild sore throat or "cold" with a little fever, and we find only buried tonsils, tiny, white plugs perhaps occluding the visible follicles, and the margins of the overlying pillars somewhat purple. Operation promptly restores this child to health.

Wherever backward children have been studied, almost all have been found to have adenoids, and the mental deficiency of a very large percentage of these is to some extent relieved by adenectomy, in many cases entirely so.

In New York City of 650,000 school children, thirty per cent. are estimated to be two years behind their grades, and ninety per cent. of these are delinquent because of remediable eye, ear, nose or throat ab-

normalities. Of 150 marked defectives, very backward in study and incorrigible, 137 were found to have diseased tonsils and adenoids. Six months after operation, on re-examination, all were doing well in school and had much improved in morals.

It is estimated six million school children in the United States have operable adenoids. It is impossible to adequately portray the enormous amount of backward and deviate mental development originating from this cause, nor to compute the monetary cost thereof; and how much of the inefficiency and even crime of later years is traceable to the mental and moral degeneracy caused by adenoids can only be conjectured. Certainly no juvenile or probationary court can fulfil its proper function unless it is prepared to avail itself of competent medical and surgical assistance in the study of every delinquent brought before it, and under the jurisdiction of such courts, treatment of all remediable, physical defects should be afforded.

Deafness, which, to a varying degree, occurs in almost all adenoid cases by reason of eustachian involvment, accentuates the mental deficiency, and may become irremediable by serious infection of the middle ear. This middle ear infection is one of the most common sequellae of adenoids, and is itself frequently followed by still more important infectious processes, mastoiditis, sinus phlebitis and thrombosis, and brain abscess.

That these late complications of adenoid disease may be so remote as to almost wholy obscure their origin is well shown by this case:

W. H., fifteen years old, came under my care some years ago after having been desperately ill for some four weeks with what had been regarded as typhoid fever. This diagnosis was excluded by serologic and other methods. Attention was then attracted to a small wad of dirty cotton in the left auditory canal, and a history of ear discharge since infancy was elicited. A final diagnosis of sigmoid sinus infection was made, and after exposure of the sinus and drainage of a large amount of pus therefrom, together with excision of the internal jugular vein, the boy made a hazardous recovery.

An eye and ear specialist was associated throughout in the study and care of this case, after the discovery of the ear condition, but it may be said, entirely without disparagement of him, that the diagnosis was arrived at largely by means of diagnostic methods not within the scope of his specialty, but of routine use in the work of the general clinician. Had such methods not been employed, or had we been satisfied to accept as final the negative findings of the first examinations of the aurist and occulist, the boy would have died of "typhoid fever." The favorable outcome of the case resulted wholly from complete cooperation of specialist and clinician, such as should always prevail under these circumstances.

Many cases of acute or subacute purulent otitis media will persist in spite of all local treatment, until the adenoids and tonsils are removed, and will then quickly clear up regardless of local treatment. The same prompt recovery cannot of course be hoped for in cases of chronic otitis media because of the extent to which the destructive process has advanced in the

ear, but the throat operation is still a fundamental part of the treatment in many of these patients.

More or less cervical glandular involvement is usually associated with bad tonsils and adenoids, and this lymphadenitis may at times be extremely acute, the glands rapidly attaining huge proportions and going on to early suppuration. In other cases, the glandular enlargement proceeds more slowly, the hyperplasia becomes chronic, and there is little tendency to suppuration. (Tuberculous infection will be mentioned later.)

The proper treatment of these glandular infections is removal of the tonsils and adenoids, and the more acute the process, the more immediately should the operation be done, except in the presence of an active tonsillitis. I have several times operated on these cases at night rather than risk a delay until morning, and am often amazed at the rapidity with which the glandular swelling will melt away within a day or two.

Some months ago the oldest of three little brothers, five, three and one and a half years old, suddenly developed a very acute cervical lymphadenitis. He had not shown any indication of tonsillitis but the children's nurse had just recovered from a sore throat. Some four or five days later, the second child exhibited the same condition, and after a similar period, the third child. Early suppuration was threatened in each case, and in each tonsillectomy was done within twenty-four hours of the onset, with prompt subsidence of the glands. (The tonsils in each of these children afforded indications for removal aside from the adenitis.) It seems clear, in these cases, that we had an infection, primarily of the tonsils, with an organism having a fairly definite incubation period and with marked affinity for lymphatic glands. I have never encountered a similar instance of such infection occurring thus in several members of a family. Rosenow doubtless could have isolated from these glands a streptoccocus corresponding to some of those whose peculiar properties he had described.

Chorea, rheumatism, and endocarditis are a trilogy which, by common consent, are frequently accorded a common origin in tonsil infection. Chorea, as claimed by some writers, may in many instances not properly be so classified, but that the association of these conditions is common we all know; and chorea is often relieved by tonsillectomy. The work of Billings and Rosenow seems to show that a large proportion of all acute and chronic, non-traumatic joint lesions originate from some focus of infection elsewhere in the body, in the great majority of cases this focus being the tonsils. Frequently tonsillectomy will abort a beginning, acute arthritis, or check progressive articular changes due to chronic infection from the tonsils; and many cases of acute arthritis are directly traceable to tonsil infection.

As to the heart, how many instances we can cite of serious and some-

times fatal cardiac infections supervening on a tonsilitis, and the same may be said of nephritis. In how many children we see lesser, previously unsuspected heart lesions with no history of previous illness and nothing to account for them except submerged tonsils such as I have previously described. Two such occurring in children under two years old are now under observation.

Last December, I saw for the first time A. E., five years old. He had been sick two weeks with an intermittent fever, and had complained of pain in his right leg. Muscular twitching had begun the day I saw him, and was very marked. The tonsils were submerged and chronically inflamed. The parents stated that this had been known and operation contemplated for some six months. No heart lesion could be detected at the first examination, but beginning endocarditis was manifest the following day, and developed with overwhelming rapidity, accompanied by a chorea so severe that the child jerked himself out of bed when not restrained, and bit his tongue like an epileptic. Death occurred within four and a half days of my first visit.

This child was a sacrifice to parental procrastination in respect to the acknowledged necessary tonsil operation.

In June, 1914, J. M., three years old, suddenly, without other manifestation of illness, developed effusion in all of the joints, so far as could be determined, and in the pericardial, pleural and peritoneal sacs. The child's father had just had a "sore throat." It was advised that the child's condition was probably due to infection from this source; but as she was under treatment by a surgeon for a congenital defect, and consultants did not attach much importance to this factor, tonsillectomy was not then urged. In January, however, seven months later, the child's general condition becoming progressively worse and there being no change in the joints, operation was insisted on. Within a few days, there was a diminution of the swelling of the joints, and the child's health markedly improved. There is still some fluid in the larger joints, but there is in my mind no question as to the etiology, and no doubt that had prompt operation been done, recovery would have been prompt. As it is, complete absorption of the fluid has not yet been attained and numerous remissions have occurred, but it is to be noted that no improvement occurred until after tonsillectomy, although conventional, constitutional and local treatment had been carried out (salicylates, iodides, etc.) No organisms could be isolated at any time from the joint fluids, or from an excised lymphatic gland, and no specific organisms were recovered from the tonsils. Animal inoculations were likewise negative, and the diagnosis therefore rests upon analogy and upon the therapeutic operative test.

H. W., two years old, is an extraordinary case of kidney involvement following tonsil infection. Never well and strong, she was seen by me last December, after repeated attacks of suppurative otitis media. Her general condition was very poor, and she presented large submerged tonsils and adenoids. Operation was followed by uneventful recovery, until at the end of some three weeks, anasarca suddenly developed, and the urine, normal at operation, was found to contain large amounts of albumen, ranging, (Esbach test), as high as twenty-five to thirty grammes per liter, largely globulin. Treated with alkalies, dextrose, and diaphoresis, with a milk and carbohydrate diet, the child has slowly improved, though still passing five to ten grammes of albumen per liter of urine. The onset so long delayed after operation would seem to exclude a diagnosis of ether nephritis, and it is probable that the condition would have arisen regardless of operation. However, the case may offer some argumentative material for opponents of tonsil surgery. Possibly operation was inopportune, being done in too close sequence to an active infection of the

throat, but I am inclined to believe that a hematogenous infection already existed. This child made a complete recovery.

Recurrent vomiting is a condition we are not accustomed to ascribe to tonsils and adenoids, but in quite a considerable experience with children suffering from this disorder, I have come to believe that throat infections are the most important single etiological factor in many of these cases; and I have numerous little patients in whom the attacks have been entirely relieved by a proper throat operation. In no case have we failed to afford great relief, and in the very few instances where attacks have occurred after operation, they have been less severe, more widely spaced, and have not long persisted. It is significant that the onset of an attack is very frequently characterized by a severe coryza.

While the pathology of acute acid intoxication with vomiting is still obscure, it is probable that there is almost always some chronic focus of infection, very commonly diseased adenoids and tonsils, the toxins from which, being constantly absorbed, act primarily upon the liver. From time to time by reason of the cumulative effect of the toxins, or further disturbance of the already impaired equilibrium of metabolism by dietetic indiscretions, or by excitement, fatigue, or other nervous element, there results a failure of the liver to perform its functions. The processes of carbohydrate metabolism are first disarranged, the frequency and severity of the attacks in childhood being due perhaps to the fact that the reserve supply of glycogen in the liver is not so great, proportionately, in children as in adults, and that therefore any interference with the glycogen storing or glycolytic powers of the liver, there being no longer a proper supply of sugar available, induces an immediate disturbance of fat and protein metabolism, manifested by the appearance in the urine of the acid bodies characteristic of this condition. Whether these are concerned in the production of the symptoms, or are merely secondary products of the morbid process, cannot now be told.

The organisms of acute infectious diseases, measles, scarlet fever, diphtheria, influenza, and poliomyelitis—enter the body through the nasopharyx, and doubtless a healthy state of the mucous membrane and lymphoid structures of this region constitutes our first line of defense against such infections. Contrawise, unhealthy conditions of these structures tend to prolong the period of infectiousness after recovery from some of these diseases, it being well known, for example, that diphthteria carriers can be cleared up most quickly and effectively, and in many cases only, by removal of the tonsils.

Diseased tonsils have been at times accorded considerable etiological significance as portals for the entrance of tubercle bacilli into the body in cases of pulmonary tuberculosis, it being claimed that they pass to the lungs direct by the lymph channels; but histologic and bacteriologic study of the tonsils reveals tuberculous changes and bacilli in

these structures comparatively infrequently, except in individuals having open tuberculosis, and in whom it is probable that the tonsil condition is a secondary focus. In tuberculosis of the cervical lymph nodes, however, the infection undoubtedly does enter through some portion of the lymphoid ring of the pharynx; and adenoids and diseased tonsils so profoundly affect the child's general physical condition that their presence must be considered to predispose to tubercular infection in other parts of the body. No child is therefore adequately protected against tuberculosis who has bad tonsils or adenoids.

The conditions I have herein referred to and the cases cited are by no means exceptional. It must be clear then that pharyngeal abnormalities and infections are not the peculiar concern of the throat specialist, but are of such far reaching importance in respect to other structures as to be of great concern to every one of us. Hardly any one of us, however restricted his field of work, but must constantly take cognizance of the tonsils as etiological factors in causing disease elsewhere.

What then should be our attitude toward these organs? I bespeak a rational conservatism, which should prevail, only for so long as the tonsils and adenoids are known to be guiltless in any given case. Prompt and radical surgical treatment should be instituted whenever they may be reasonably suspected of being at fault. Only in this way can some of the disastrous consequences such as I have described be obviated. Throat specialists, however, should not primarily treat nor operate on tonsil cases except in co-operation with or after examination by a clinician. Cases coming direct to the throat man should be referred to a clinician.

Are we then to argue that the tonsils are functionless and useless? By no means. The limitations of this paper will not permit a discussion of the function of the tonsils. Numerous erudite papers by able men have been written in their defense, many of which I have carefully read. It seems to me that much of the argument adduced is purely theoretical. Removal of the tonsils is said to do harm of an obscure nature, never, however, demonstrable. No child that I have seen operated has ever developed any abnormality which could be ascribed to the loss of these organs, while almost all have shown the improvement which was anticipated. It may be that the tonsils have the immunizing or protective properties claimed. However, there is no argument in proof of this which is not equally applicable to adenoids, so far as structure or position is concerned, yet the adenoid seems to have no defenders. Personally, I doubt if tonsils or adenoids have any more protective power than any other individual lymphoid follicles which we know to be innumerable throughout the body. If they have, it is very easily overcome, and they then become most dangerous foci of infection.

One very weighty objection to tonsillectomy must, however, be conceded, but it is of medico-economic rather than physiologic significance.

Some time since, while talking with a father from whose three children I some years ago removed extremely bad tonsils—he said to me: "Doctor, taking out my children's tonsils has cost you about two hundred dollars a year." He was right. Tonsillectomy has been ruinous to some of my best practice.

DISCUSSION.

Dr. Evans said that there is not the proper co-operation between the internist and nose specialist and until that day comes we will often hear of such cases as those presented in this paper. The day is coming when the surgeon will refuse to go ahead and take the responsibility of operating against the advice of the internist.

We all of us see cases of submerged tonsils which we send to the throat specialist only to have them returned to us with the remark that there is no reason for their removal. It is these small tonsils which cause the marked symptoms of acute and chronic disease. Sufficient attention has not been paid to the tonsils as the real causative factor in many diseases.

Dr. Robert T. Morris said that disease is a question of comparative enzymic fights. This brings up the fact that the older surgeons have brought up the question of vaccines. The man who does not know how to use vaccines does not do high class work.

Dr. W. Wayne Babcock said that infection early in life, in children, may nearly always be traced back to the naso-pharryngeal ring. Later on these same people, as adults, have intestinal trouble and still later on gall bladder disturbances.

The close connection between infections of the nose and throat and the gastro-intestinal tract, and rheumatism may well be shown by the fact that practically the same drugs are used to give relief in all three cases. Calomel is given for all three, so also the salicylates are used for tonsilitis and for muscular rheumatism. These facts should stimulate us to corelate our knowledge of metastasis, and so obtain better control of the treatment of these diseases.

Vaccines injected into the tissues in excessive doses producing necrosis, have often resulted ultimately in an immense amount of good. This has been due to the stimulation of antibodies, really an over-stimulation due to the excessive dose of vaccine.

Dr. McCleave in closing the discussion said that the real purpose of this paper was to bring out the point that throat specialists have no right to treat these cases when they come to them, except after subjecting them to examination by a clinician. Some of the chronic and sub-acute diseases could have been prevented if the child had come to the clinician first.

PYORRHŒA ALVEOLARIS.

Its Treatment With Bacterins and Emetine Hydrochloride.

BY F. E. STEWART, PH.G., M.D., PHAR.D.,

Professor of Materia Medica, Department of Pharmacy and Chemistry,

Medico-Chirurgical College.

PHILADELPHIA, PA.

Pyorrhœa alveolaris or Rigg's disease is a name given to a group of symptoms caused mainly by infection of the gums, teeth, and alveolar processes by pathogenic microorganisms. These disease producing microbes are doubtless constantly present in healthy mouths, living as saprophytes on particles of food, cast off epithelial cells, and other waste matter, and doing no harm. If for any reason the vitality of the tissues is lowered, they become parasites and live at the expense of the tissues.

The lowering of tissue vitality predisposing to mouth infection may be due to one or several causes. It may be caused by enervating habits, intestinal stasis and autointoxication, improper food, indigestion, functional derangement or disease of some body organ. Pyorrhœa alveolaris is therefore a link in a chain of pathogenic conditions constituting a vicious circle, each link of which may be considered a cause or an effect depending upon the point of view.

The treatment of pyorrhœa alveolaris should therefore be directed against the pathological conditions as a whole and not limited to the mouth infection, and should consist of measures for destruction of the infecting microorganisms, restoration of injured tissues, and the removal of concurrent systemic affections.

Let us first consider the local conditions commonly called Riggs' disease: The infecting microorganisms are of two kinds, viz., protozoal and bacterial, the former known as entamœba buccalis or entamœba gingivalis Gros, probably constituting the primary infection in the majority of cases, and the latter consisting mainly of bacteria almost constantly found in the mouth and usually including staphylococci, streptococci, pneumococci, and the micrococcus catarhalis group.

The primary infection is believed to begin in early adult life or earlier, and usually is not at first recognized as the pyorrheic discharge is probably due to the secondary bacterial infection which occurs later. The infecting microorganisms first attack the peridental membrane or periosteum which

covers and nourishes the root of the tooth and tooth socket. As the disease progresses, the tooth socket is gradually destroyed, the tooth becomes loose, and finally drops out. Ulceration of the gum attached to the tooth also occurs. This damaged tissue becomes an excellent culture medium for the growth of the mouth bacteria as well as entamœbas.

Emetine hydrochloride. Emetine is an alkaloid derived from ipecacuanha. Ipecac has been extensively used and highly recommended for the treatment of dysentery since its introduction by Piso in 1658. Recent investigations by Rogers (1) demonstrated that a one to 10,000 saline solution of its principal alkaloid—emetine—was rapidly fatal to amœbas in freshly passed stools. In the treatment of amœbic dysentery he employed emetine hydrochloride hypodermically, injecting as an initial dose one-sixth grain, rapidly increasing this to one-third grain twice daily. Allen (2) confirmed these observations. Lyons (3) called special attention to the value of emetine in amœbic dysentery of the Gulf States, because of the frequency with which the disease is met there. The average length of treatment by emetine until stools become normal was nine days for the five cases reported. The shortest interval was two days and the longest twenty days. The largest dose was three quarters of a grain. There were no ill effects noted from this dose. Maxwell (4) extolled ipecac and emetine as a result of his experience in China.

We are indebted to Barrett (5), Smith (6), Bass and Johns (7), Evans (8), Middleton (9), and others for the researches which have enlightened us in regard to entamœba buccalis as an infecting agent in pyorrhœa alveolaris, and the treatment by emetine. According to Bass, the demonstrable entamœbas can be destroyed by giving one half grain of emetine hydrochloride hypodermically for three to six successive days. Bass recommends its use hypodermically or intramuscularly in doses of one fourth to one grain, but states that it has been given by the rectum, also in keratin coated pills by the mouth. Both authors recommend the employment of the drug locally in the form of one half to one per cent. solution, injected by means of a hypodermic syringe deeply into the pyorrhœa pockets. Each pocket is left filled with the solution as the needle is withdrawn. Bass recommends rinsing the mouth thoroughly with a solution of fluid extract of ipecac, two or three drops to a half a tumbler of water, which, he believes, protects against reinfection and actually cures the disease in its early stages. He believes that patients can carry out this treatment in many instances.

Bacterin treatment. The use of bacterins or bacterial vaccines in the treatment of pyrrhœa has been in vogue for some years and is highly recommended by a number of distinguished observers. One of the first important contributions to the bacteriology of the mouth was that of Miller (10) more than twenty years ago. In 1885, he had isolated twenty-two kinds of bacteria from the human mouth, and of "thirty species cultivated

later eighteen were cocci, eleven rods, and one grew into threads." Leeuwenhoek, however, as early as 1682, drew attention to living microorganisms which he called animalcules, in material removed from the teeth, and therefore was really the pioneer in the discovery that microbes are to be found in the mouth.

Hunter (11) emphasized the importance of infection caused by staphylococcal and streptococcal organisms. Hunter also quotes Arkovy, who found that bacillus gangrænæ pulpæ was present in ninety-five per cent. of cases with diseased pulp and dental caries. In 1869, Dr. J. M. Riggs read a paper describing what is now known as pyorrhœa alveolaris, in which he stated that he had recognized and treated the disease for twenty-five years previously. This contribution resulted in the adoptiion of the name, Riggs' disease, to describe the condition now under consideration.

The attention of bacteriologists was thus quite generally attracted to the study of the condition we now know as pyorrhœa. Vincentini (12) made a microscopical study of the mouth flora and called attention to certain fungus forms found in the oral cavity. Goadby (13) began his bacteriological study of pyorrhœa in 1904, and in 1906 reported his expérience in treating eighteen cases. In the Erasmus Wilson lecture delivered in 1908, further experience was reported. In the seventy cases studied by him, including the eighteen previously recorded, he found streptococcus nineteen times, bacillus necrosis dentalis fourteen times, micrococcus catarrhalis twenty-three times, bacillus septicus fifteen times, staphylococcus aureus twelve times, saccharomyces five times, pneumococcus, five times, micrococcus citreus granulosis six times. In a subsequent report published in 1908, he announced the finding of streptococcus brevis and staphylococcus albus and saccharomyces in two additional cases, and later discovered an anaerobe, bacillus necrosis dentalis, which he called a diplobacillus. This investigator, in 1909, reported the finding of a leptothrix, bacillus fusiformis, in three varieties of spirochœtes. His work attracted much attention.

The next papers of importance were those of Eyre and Payne (14), who in 1909 published their findings in the *Proceedings of the Royal Society of Medicine.* Contributions by Mayou (15), Beebe (16), Whittle (17), Best (18), Sims (19), Williams (20), Logan (21), and other investigators added to the interest in the subject. Medalia (22), Leary (23), Cummins (24), Collins (25), Head (26), Hickens (27), Brown (28), and other investigators added important contributions to our knowledge of the bacteriology of Riggs' disease and its bacterin treatment. The limits of this paper will not permit a review of their work. A list of their papers appears in the appended bibliography.

These authorities are all in accord in regard to the necessity of eradicating the focus of infection as completely as possible by proper operative pro-

cedures. Various methods for accomplishing this purpose are recommended. Joseph Head, of Philadelphia, recommends a solution of ammonium bifluoride containing ten per cent. free acid, as an aid in destroying the infection and obliterating the pus pockets. He says the solution may be injected once or twice a week into the pockets around loose teeth, but care must be taken not to inject it into fresh cuts, as such procedure will sometimes cause great pain. After one or two injections, soreness and inflammation disappear and even the general symptoms of toxemia caused by the infection sometimes abate. The tartar scale that could not be easily and painlessly removed during the first two treatments, becomes so loosened as to make its removal by scalers easy for both patient and dentist. After four or five applications, one week apart, black scales that has escaped the instrument will sometimes be found floating loose in the pockets, so that they can readily be picked out, and finally the root becomes smooth to the touch of the instrument—and the pockets disappear.

The *Journal A. M. A.*, for February 13, 1915, in an editorial article entitled Entamœbas and Pus Pockets About the Teeth, comments favorably upon the work of Barrett, Smith, Bass, and others, but cautions the profession against the dangers of reinfection, after a cure seems to have been accomplished. The editor says that the word "cure" should be used with caution, and that it is evident that some who have been studying these cases have considered them "cured" when no more entamœbas were demonstrable, apparently without considering the tissue changes and conditions which prevent the closure of the pocket. A case should not be considered cured when there remains the constant irritant— the denuded cementum—which maintains the harbor for reinfection. This fact—that such treatment does not result in permanent cure—seems already partially recognized in the report of Bass and Johns as they state that reinfection has occurred in about twelve per cent. of cases within four weeks. The editor also cautions that the pus pocket is always preceded by gingivitis, which may be so insidious in its onset as scarcely to attract the patient's attention.

It is therefore evident that the recommendation of Bass, who suggests the use of fluid extract of ipecac or emetine as a local application to the gums and teeth in tooth washes, should be adopted. This does not make it any less necessary for the patient to go to the dentist at stated intervals for a thorough examination of the gums and teeth to prevent recurrence. It is absolutely essential that dead and infected pulps should be removed and the root canals filled, and all tartar should be removed from the roots of the teeth and prevented from accumulating by proper attention on the part of both patient and dentist.

Practical application of emetine and bacterin treatment. Preceding the use of bacterins, emetine should be employed to destroy the amœbas in the gums, dental tissues, and alveolar processes. The solution of emetine hy-

drochloride, 0.5 per cent. in strength, should be forced down into the pockets with a hypodermic syringe and each pocket left filled with the solution. This treatment should be repeated daily for three or four days. After healthy appearance, the teeth should feel firmer, and the gums about them become tighter and harder. A microscopical examination should preferably be made in each case before treatment, and after the fourth day the examination should be repeated to assure the absence of all demonstrable entamœbas.

It may be unnecessary to employ bacterin treatment, in which case the operative procedures for obliterating the pus pockets may be all that is required in addition to the emetine treatment. But in chronic cases of pyorrhœa alveolaris, not only are the tissues infected with bacteria, but in all probability the infected mouth has become a focus of infection to the entire system, in which event bacterin therapy may prove of great value not only in curing the local condition, but also in the restoration of the general health and in raising the resistance of the tissue to a higher plane, thus insuring against reinfection.

The bacterin is usually injected under the skin of the arm at the insertion of the deltoid; any other site where the skin is loose may be selected A stock vaccine may be used, either sensitized or unsensitized, or an autogenous vaccine prepared from the pus pockets may be employed. It is considered good treatment to begin with a stock bacterin either sensitized or unsensitized, the former being preferable on account of the comparative ease with which it is digested and assimilated by the tissues, the freedom from local or general reaction, and its promptitude in stimulating immunity. If an autogenous vaccine is preferred, care should be taken to select an experienced bacteriologist for its preparation.

If an unsensitized bacterin is employed, the initial dose advised is 150 million of the mixed bacteria; 250 to 750 million may be given as the initial dose if the sensitized cultures are employed. Subsequent doses are injected at intervals of seven to ten days, gradually increasing or decreasing according to indications. If the reactions are too severe, the doses should be reduced or temporarily discontinued. Every dose should be carefully gauged by the effect obtained from the preceding dose. The doses should be graded by the history of the case as it develops. The duration of the infection, the extent and severity, the age and condition of the patient, are all important factors. When the general health of the patient is good, response is more effective than when the patient is run down. If no improvement follows the initial dose, subsequent injections should be increased until amounts large enough to produce a mild clinical reaction (demonstrated by symptoms of malaise and possibly aggravation of the local symptoms) are reached. If a marked clinical reaction occurs after a dose, characterized by rising temperture and considerable systemic depression, the next dose should

be smaller. The usual intervals between doses as used by dental surgeons, is one week.

The patient should use a tooth wash containing ipecac or its alkaloid, emetine, and continue to use it after a cure has been accomplished.

Finally, in relation to the constitutional infection, the symptoms are often incorrectly diagnosed as anemia, malnutrition, uric acid diathesis, etc. Want of recognition of the fact that oral sepsis may be the source of many constitutional diseases has resulted in disaster to the patient and to the reputation of the physician. As stated by Hunter, these attacks include every degree and variety of tonsillitis and pharyngitis; of gastric trouble from functional dyspepsia up to gastritis and gastric ulcer; and every degree and variety of enteritis and colitis, and troubles in adjacent parts, e. g., appendicitis. The effects fall in the second place upon the glands (adenitis); on the blood (septic anemia, purpura, fever, septicemia); on the joints (arthritis); on the kidneys (nephritis); and on the nervous system. In the case of the mouth, the mere presence of staphylococci and streptococci on the surface of the mucosa, or on the tongue, or in the mouth secretions, or in the saprophytic flora, which appear in the mouth, does not of itself cause disease, any more than their presence on the uninjured skin. But the matter is totally different when they become seated in open wounds in the edges of the gums adjacent to carious teeth, or extend from this, their first site, downward along the periosteum (peridental membrane) of the tooth socket. The infection is then no longer a superficial one—it is in connection with the soft tissues, periosteum, and bone.

The importance of Hunter's observations were not at first fully realized. Mouth infection as a cause of systemic disease did not impress the profession in proportion to its gravity until the subject was taken up for systematic study by some of the leaders in the medical profession, whose contribution to the symposium on mouth infections, in the *Journal A. M. A.*, December 5, 1914, began to bear fruit. These contributions to the section in stomatology at the sixty-fifth annual session of the A. M. A. at Atlantic City, and the discussion present an important chapter in the history of pyorrhœa alveolaris. Papers by Frank Billings (29), C. H. Mayo (30), E. C. Rosenow (31), C. Burns Craig (32), T. L. Gilmer (33), and A. M. Moody, and the discussions by Dr. A. D. Black, Dr. M. I. Schamberg, Dr. W. A. Price, Dr. F. B. Moarehead, Dr. John S. Marshall, Dr. G. V. I. Brown, Dr. W. O. Bridges, Dr. H. W. Frauenthal, Dr. T. W. Corwin, Dr. W. H. Mercur, and Dr. J. A. Pettit, emphasized in the strongest language the serious nature of pyorrhœa alveolaris as a focal condition producing constitutional disease. It therefore becomes important to call the special attention of the profession to the necessity of recognizing it as such. I am constantly appealed to by the profession for information concerning the latest methods for treating Riggs' disease. I have answered during the

past year no less than fifty letters on the subject. My experience in this regard leads me to bring this subject before my readers.

BIBLIOGRAPHY.

[1] Rogers: *British Med. Jour.,* June 22, 1912; Aug. 24, 1912.

[2] Allen: *Journal A. M. A.,* March ??, 1913, p. 664.

[3] Lyons: *Ibid.,* April 19, 1913.

[4] Maxwell: *China Medical Journal,* March, 1913.

[5] M. T. Barrett: The Protozoa of the Mouth in Relation to Pyorrhœa alveolaris, *Dental Cosmos,* August, 1914; Clinical Report upon Amebic Pyorrhœa, *Ibid.,* December, 1914.

[6] Allen J. Smith, William S. Middleton, and M. T. Barrett: The Tonsils as a Habitat of Oral Endamebas, *Journal A. M. A.,* Nov. 14, 1914, p. 1746.

[7] C. C. Bass and F. M. Johns: The Specific Cause and the Prompt Specific Cure of Pyorrhœa alveolaris or Riggs's Disease, *New Orleans Med. and Surg. Jour.,* Nov., 1914. C. C. Bass and F. M. Johns: Pyorrhœa dentalis and Alveolarism—Specific Cause and Treatment, *Journal A. M. A.,* Feb. 13, 1915, p. 553.

[8] J. S. Evans and William S. Middleton: Endamebic Pyorrhœa and Its Complications, *Ibid.,* Jan. 30, 1915, p. 423.

[9] Idem: *Ibid.*

[10] W. D. Miller: *Die Mikroorganismen der Mundhöle.*

[11] William Hunter: Oral Sepsis as a Cause of Septic Gastritis, Toxic Neuritis, and Other Septic Conditions, *Practitioner,* July-December, 1900, p. 611. Idem: The Role of Sepsis and Antisepsis in Medicine, *Lancet,* Jan. 14, 1911, p. 79.

[12] Filandro Vincentini: Bacteria of the Sputa.

[13] K. W. Goadby: A Preliminary Note on the Treatment of Alveolar Osteitis (Riggs's Disease) by Means of Vaccines, *British Med. Jour.,* Sept. 9, 1905, p. 562; *Transactions,* Odontological Society, March, 1906. Idem: Erasmus Wilson Lecture on Pyorrhœa alveolaris, *Lancet,* March 9, 1907, p. 633. Idem: Two Cases of Acute Pyorrhœa, *British Med. Jour.,* Aug. 22, 1908, p. 477. Idem: *Ibid.,* ii. p. 667, 1909. Idem: Bacillus necrosis, *Lancet,* Dec. 25, 1909, p. 1875. Idem: Vaccine Treatment of Early Cases of Pyorrhœa alveolaris, *Proc. Royal Soc. Med.,* iii, p. 58, 1909-10. Idem: *Lancet,* i, 1911, p. 609. Idem: The Relation of Diseases of the Mouth to Rheumatism, *Practitioner,* lxxxviii, 1912, p. 107.

[14] J. W. Eyre and J. Lewis Payne: Some Observations on the Bacteriology of Pyorrhœa alveolaris and the Treatment of the Disease by Bacterial Vaccines, *Proc. Royal Soc. of Med.* (Odont. Sec.), Nov. 22, 1909. Idem: *Ibid.,* iii, 1910, pp. 29-61.

[15] Stephen Mayou: Some Staphylococcal Infections of the Eye and Their Treatment with Vaccine, *Ophthalmoscope,* 1908, p. 566.

[16] T. C. Beebe, Jr.: The Opsonic Treatment of Pyorrhœa alveolaris, *Boston Med. and Surg. Jour.,* Oct. 27, 1909, p. 613.

[17] Whittle: Odont. Soc. Report, *Brit. Med. Jour.,* April 28, 1902.

[18] Victor G. Best: Pyorrhœa alveolaris, *Dublin Jour. of Med. Science,* cxxxiii, p. 91.

[19] Harold Sims: Bacteriology of Pyorrhœa alveolaris, *Dental Practitioner,* Oct., 1908.

[20] William R. Williams: The Vaccine Treatment of Pyorrhœa alveolaris, *Am. Jour. of the Med. Sciences.* cxii, 1911, p. 666.

[21] W. H. G. Logan: Diagnosis and Prognosis of Pyorrhœa alveolaris (so called), *Dental Review,* xxv, 1911, p. 649.

[22] L. S. Medalia: Chronic Alveolar Osteomyelitis (Pyorrhœa alveolaris); Its Causes and Treatment with Vaccines, *Dental Cosmos,* Jan. and Feb., 1913.

[23] Timothy Leary: Pyorrhœa alveolaris, *Ibid.,* 1909, p. 55.

[24] Robert C. Cummins, M.B.: The Results of Autointoxication Taking Place from the Mouth in Oral Sepsis, and Its Treatment by Bacterial Vaccines, *Jour. of Vaccine Therapy,* March, 1913.

[25] Joseph Collins: The Possible Relationship of Organic Diseases of the Nervous System to Riggs' Disease, *Journal A. M. A.,* June 7, 1913, p. 1779.

[26] Joseph Head: Vaccines in Relation to Mouth Infection. Idem: Treatment of Loose Teeth Due to Inflammatory Degeneration of the Gums and Alveolar Process, *Journal A. M. A.,* Dec. 20, 1913, lvi, pp. 2232-2236. Idem: Treatment of Oral Infection in Its Relation to Systemic Disease, *Jour. Allied Dent. Societies,* ix, June, 1914, pp. 211-226.

[27] A. P. Hitchens: Rationale of the Use of Bacterial Vaccines in Pyorrhœa alveolaris, *Dental Cosmos,* Jan., 1915, p. 1. Idem: Sajous's *Cyclopedia of Med.,* ii, 1912, p. 296.

[28] C. P. Brown: The Bacteriology of Pyorrhœa alveolaris, *New York Med. Jour.,* Dec. 20, 1913.

[29] Frank Billings: Mouth Infection as a Source of Systemic Disease, *Journal A. M. A.,* Dec. 5, 1914, p. 2024.

[30] C. H. Mayo: Mouth Infection as a Source of Systemic Disease, *Journal A. M. A.,* Dec. 5, 1914, p. 2025.

[31] E. C. Rosenow: Mouth Infection as a Source of Systemic Disease, *Journal A. M. A.,* Dec. 5, 1914, p. 2026.

[32] C. Burns Craig: Peridental Infection as a Causative Factor in Nervous Diseases, *Journal A. M. A.,* Dec. 5, 1914.

[33] R. L. Gilmer and A. M. Moody: A Study of the Bacteriology of Alveolar Abscess and Infected Root Canals, *Journal A. M. A.,* Dec. 5, 1914, p. 2023. Symposium on Mouth Infection, before Sec. in Stomatology at 65th annual session of A. M. A., June, 1914, *Journal A. M. A.,* Dec. 5, 1914. Editorial article, Entamebas and Pus Pockets about the Teeth, *Ibid.,* Feb. 13, 1915.

DISCUSSION.

Dr. C. C. Bass, New Orleans (by invitation), said that the subject of pyorrhœa is of interest to dentists and physicians. This subject has lately been given additional attention largely because of the promised new treatment. I refer to the use of emetine hydrochloride. The use of emetine is based upon the claim that the specific cause of pyorrhœa is the entamœba buccalis. If this is true then emetine is a specific for the disease. Emetine is the only drug we know of that is especially toxic to the entamœba, and is the only drug which can be given in a sufficient dose to kill the entamœba in the tissues, being more toxic to the entamœba than it is to the tissues. Quinine is the remedy for malaria because it is so much more toxic to the plasmodium than to man, and will kill the plasmodium in man without harming the host. Emetine is toxic to all amœbæ. But to do any good we must place the emetine in direct contact with the entamœba. It would be no surprise to learn that some forms of pyorrhœa are protected from emetine given locally or in the blood stream. A local application usually will kill all of the amœbæ with which the drug comes in contact, but we cannot always reach all of the amœbae either local or general. The application of emetine and its success depends on the ability of the operator to reach the organism.

To sterilize the mouth of the individual and render him free from the entamœba is not sufficient since this is a general disease to which we are all subject. We all

eat and drink from utensils used by other people and thus the individual whose mouth has been rendered free from the entamœba may readily be reinfected. The only way to avoid reinfection is to stop using implements used by other people.

Entamœbæ are present in all cases of pyorrhœa. We have examined 500 cases and in every one have found them present. In the absence of pyorrhœa, none have been found.

Dr. Robert T. Morris said this paper belongs to the Fourth era of surgery, that is, retaining and increasing individual resistance. This applies to immunity. The great question relates to getting this matter properly before the people, and securing their co-operation with us. It will be a very difficult matter. When this disease and its treatment with emetine was presented at Atlantic City, I asked leading dentists in New York about it. Some were enthusiastic to an extent which would not impress the scientific mind, some doubted if it were of any importance, others believed that the control of the disease could be accomplished in other ways than by the use of emetine. When any new subject is presented, hypotheses run ahead of verification. The idea Dr. Stewart has given of increasing the individual's resistance belongs to our new line of work. The fact of learning how to destroy the cause of pyorrhœa is not so important as the method of safeguarding the individual against reinfection.

Dr. Stewart asked what of the possibility of the entamœba having some influence in rendering the tissues liable to other infection?

Dr. Bass, replying, said that there is a difference of opinion as to how the disease is produced and whether the entamœba has any influence in causing the disease. Dr. Johns has an exhibit here which shows the presence of the entamœbæ in the tissue and how they cause the spread of disease. We are able to demonstrate them in all stages of disease. The pyorrhœa pockets contain all kinds of bacteria. The entamœbæ are large animals compared to the bacteria in these pockets. They may even eat the bacteria. Some of the bacteria they do not kill, although they may absorb them, and on going back into the tissues may carry some of the living bacteria with them. The entamœbæ produce disease by mechanically spreading bacterial infection. Emetine is an absolute poison to the entamœba and if given in sufficient concentration may cause necrosis of the tissues with which it comes in contact, or at least produce great irritation. Emetine when injected deeply into the tissues, where it is rapidly absorbed, will not produce irritation to so great an extent as when applied on the surface. Sore mouths are frequently found where ipecac is used to excess as a mouth wash.

Dr. Robert T. Morris asked if it is possible that the entamœba is symbiotic with some bacterium? If this is true then our secondary troubles are due presumably to the transplanting of such bacteria.

Dr. Stewart, in reply, said that Dr. Barrett says he believes there is something in this, but it has not been worked out.

Dr. Bass said that the entamœbæ must live symbiotically. If we produce a sterile lesion, plant the entamœbæ in it without bacteria gaining admittance, the entamœbæ will die in a few days. Entamœbæ live on tissues which are inflamed and irritated by bacteria.

Dr. Mattison said we have found that cultures obtained from the teeth contained not only the entamœba but also the Streptococcus viridans and haemolyticus. We have made vaccines and used them in every case treated by us. I believe that by the use of emetine we can get rid of the entamœbæ, but we must use vaccines to get rid of the streptococci. Dr. Mayo has stated that from the experiments he has had made,

he believes that some cases of arthritis deformans, cholecystitis, etc., are caused by the presence of infecting microorganisms in the blood stream and that these can be recovered from the blood stream as well as from the tonsils, gums and teeth. Vaccines in these cases work like magic and when accompanied by the use of emetine do much toward eradicating pyorrhœa. Dr. Breed, our pathologist, says that in taking cultures from the gums you must get them from the firing line, that is below where a swab can reach. You must dig down deep where there is bleeding to recover the streptococci and entamœbæ.

Dr. Evans said there is certainly danger of mouth infection from too free use of emetine or from the use of ipecac locally as a mouth wash. We have on record a case resulting in severe ulceration of the mouth following excessive use of ipecac.

Dr. Stewart, in closing, said that entamœbæ penetrate the tissues, cause irritation and aid in producing inflammation. The tonsils may be the incubators for the growing organisms which are symbiotic with the entamœba.

THE TREATMENT OF MUSCULAR RHEUMATISM.

BY WILLIAM FITCH CHENEY, M.D.,

Clinical Professor of Medicine, Stanford University Medical School,

SAN FRANCISCO, CALIFORNIA.

A desirable preliminary to any treatment is a knowledge of what we are going to treat; and in the case of so-called muscular rheumatism this knowledge is not yet quite definite. In 1896 Lorenz wrote: "Diseases of the muscular system are rightly reckoned as one of the darkest chapters in human pathology;" and muscular rheumatism he calls "an old tradition," in which, however, we might as well continue to believe, so long as we can put nothing in its place except another name. Since the date of this expression of opinion, many other names have been proposed, but none appear to fit our knowledge any better. Today it seems generally admitted that there is no such thing as rheumatism; and there is much conflict of opinion as to whether muscles are ever involved by what we call by this name. So if the disease is neither muscular nor rheumatism, what are we to treat? Nevertheless people continue to have painful attacks which they call muscular rheumatism and which fail to disappear with the simple assurance by their medical adviser that no such disease exists. Something has happened very definitely disturbing their happiness and usefulness, and from this they demand relief, no matter what we call it.

The whole trouble lies in the fact that this disease is rarely fatal; and opportunity for examination at autopsy is therefore seldom afforded. Whether the clinical picture we see so often is due to an inflammation of muscle tissue, a myositis, or whether there is any organic change in the muscle at all is consequently a much disputed point. The literature on the subject is scanty except for case reports that throw no light on the true nature of the disease or its cause. These questions, of pathology and etiology, until the past decade have been but little discussed. Old conceptions have continued to prevail; and until quite recently as little has been known about this, one of the most common of ailments, as in the days of Hippocrates himself.

Adolf Schmidt, ([1]) recognizing this chaotic state of affairs, analyzed in 1910 the clinical facts as observed and reached the conclusion that the condition is really a neuralgia and not a myositis at all. He asserted, as the basis of all his claims, that the characteristic feature is the absence of any

visible or palpable changes, either clinically or anatomically, in the muscles apparently involved; and called attention to the transitions that occur between myalgia and neuralgia, particularly between lumbago and sciatica. With this theory, he thinks, all the symptoms of ordinary muscular rheumatism become perfectly clear, much more readily than with the conception of a local inflammatory or exudative process in the muscles themselves, which so far (he wrote in 1910) have never been really demonstrated by any one. Schmidt realized the difficulties in the way of his theory; *first* as regards the existence of sensory nerve fibres in muscles; *second,* as to the site of a lesion that would injure these supposed sensory fibres only and not at the same time the motor fibres; and *third* as to what sort a lesion could be that produced such fleeting and variable symptoms as occur in muscular rheumatism, leaving no traces behind. As regards the first point, it has been proved that sensory fibres are included in all motor nerve trunks, with end organs in muscles and tendons; but if the nerve trunk were involved, why should not pareses and atrophy of muscles follow more frequently? Schmidt's final conclusion was that the real process causing the symptoms is a neuritis of posterior nerve roots, not of peripheral nerve trunks; and that the real pathology of muscular rheumatism is therefore a radicular neuritis. This position he maintained in a second article ([2]) in 1914, after his theory had been attacked by Müller. Müller's own theory, ([3]) published in 1912, was that the characteristic features of acute muscular rheumatism are (1) hypertonus, (2) swelling, (3) local heat and (4) pain in the muscle involved; while in chronic cases there occur hypertonus, swelling, hardening of fibres and tender knots at the insertion points. By hypertonus he meant increased irritability, which led to a persistence of contraction after the cessation of irritation. From this abnormal reaction resulted stasis of blood in the muscle tissue, which in the acute stage produced swelling and increased temperature of the entire muscle, in the chronic stage, circumscribed indurations. The characteristic pain he thought was due less to the swelling than to the muscle hypertonus. To this theory Schmidt replied that Müller's teaching lacked anatomic and scientific basis; the lack of every anatomic change in the painful muscle, being the characteristic feature.

The theory most popular with the English is that put forth by Luff ([4]) in opening a discussion on this subject before the British Medical Association in 1913. He contended that all the symptom complex known as muscular rheumatism is due to a fibrositis, or inflammatory hyperplasia of white fibrous tissue in the aponeuroses and insertions of muscles, muscle sheaths and fasciae. The result is an exudation into and proliferation of the connective tissue elements, leading to swelling and thickening. Movements of the affected muscles compress or stretch these inflamed fibrous tissues and so cause the pain. Luff believed that this theory would explain not only the common types of the disease, such as lumbago and stiff neck; but also the

unusual forms in the occipital and pericranial aponeuroses, that cause the so-called indurative headaches, with palpable nodules and patches in the fibrous tissues; or the painful heel due to chronic fibrositis of plantar fascia; or the brachial neuralgia due to a subacromial bursitis.

The most recent explanation of the changes occurring in muscular rheumatism is that given by Rosenow, ([5 6 7]) whose work is by this time widely known. Both in human muscles involved, pieces of which were removed for examination; and in animal muscles, affected after experimental infection through the peritoneum, he found the characteristic pathology to be a coagulation necrosis of muscular fibres, elongated lesions running parallel with the fibres, containing few leucocytes but large numbers of living cocci. The first event is a small hemorrhage; then the muscle fibres at this site lose their striation, stain poorly, become granular and break up into fragments, with leucocytic infiltration and great numbers of organisms. These lesions, in animal experimentation, are most numerous in the more tendinous portions of muscles of the extremities, the flat muscles about the neck and shoulders, the intercostals and muscles of the spine, corresponding with the clinical types of muscular rheumatism most often observed.

This explanation offered by Rosenow of the pathology points directly to infection by streptococci as the cause of the disease. Before this time all sorts of theories had been proposed as to etiology. The oldest is that which gave the name rheumatism; of some vague substance or humid matter in the body called "rheum." Echoes of this old ill-defined tradition have come down through later times in the explanation that uric acid, or other so-called "products of metabolism" were the underlying cause; or that a constitutional diathesis, whatever that means, was at the bottom of the trouble. With the more modern theories of toxins circulating in the blood and attacking fibrous tissues or muscular fibres or nerves, an approach was made to a more rational explanation; and it is not disproved that such toxins may many times be factors, even though in some cases a true infection occurs as Rosenow described. Two other predisposing causes have long been admitted; namely, exposure to cold and muscular over-strain; both of which act by making the tissues, whether nerve, fascia or muscle, more susceptible to toxins. Rosenow makes it clear that muscle lesions are produced by streptococci of a less virulent strain than those concerned in arthritis and endocarditis; and that these show an ability to grow well at low temperatures, in fact better then than at high temperatures; which would account for the part played by chilling of the body in causing the disease.

Finally it has now been clearly proven that whether muscular rheumatism is always infectious or whether sometimes it is toxic, there are certain well-recognized foci in the body from which the organisms or the toxins come. These foci are commonly the tonsils, the gums, the teeth; the prostate gland or Fallopian tubes; or the large intestine. In the case of the

large bowel, it is conceivable that toxins originate there from abnormal chemical changes in digestion, and are absorbed thence into the blood; or that streptococci, grown in tonsils or diseased gums or carious teeth are habitually swallowed and then find their way through the intestinal wall into the blood stream and so to the muscles; or that true infectious processes in the intestinal mucous membrane due to streptococci, are the real source of supply. Until recently the evidence in favor of toxic or infectious origin for muscular rheumatism has been altogether inferential; and the part played by foci has likewise been demonstrated only by obvious relation of one to the other, painful muscular affections disappearing after discovery and removal of one of the conditions mentioned. But by Rosenow direct evidence has now been afforded, both by finding streptococci in the affected muscular tissues and by proving these of the same strain as the ones found in the foci.

The treatment of any disease means efforts to counteract it and to control its progress. Rational treatment must always proceed along one of two lines; either a removal of causes or a counteraction of effects. When neither causes or effects, neither etiology or pathology are known, therapy must necessarily be vague and uncertain. Hence it is not surprising that during the years of chaos regarding the origin and nature of muscular rheumatism, all sorts of suggestions were made for its relief. And yet it is remarkable that some of the remedies generally adopted on a purely empirical basis, because they gave relief, have really been proven by Rosenow's investigations the ones rationally indicated. The same was true of quinine in malaria, used for years before any one knew how it cured; or of mercury in syphilis, or of the salicylates in rheumatic fever. But the underlying problems are not yet altogether solved and treatment is still largely empirically used because it cures, even though its action can not be scientifically explained. The methods of treatment are numerous and are here brought together systematically, because on the one hand so little attention is given them in text-books, while on the other so many people suffer from the affection and constantly seek relief.

Acute Muscular Rheumatism: The remedies of most avail are the following:

1. *Rest:* Nature usually enforces this method of management if the attack is sufficiently acute; and movements that involve the parts concerned are instinctively shunned because of the pain they cause. Sometimes absolute rest of the whole body in bed is demanded as in lumbago; sometimes rest of one portion, as in involvement of a deltoid. The various "porous plasters" so largely used without medical advice no doubt give relief mainly by mechanical support and fixation of the painful muscles. Support of the head by pillows in such a way that it can not be moved suddenly; or of a

limb by sandbags; or of the back by criss-cross strapping with adhesive plaster, all have great value in procuring rest and so in relieving pain.

2. *Heat:* Whether cold causes the trouble or not, it certainly increases the pain when once it has come; while heat is always grateful and gives relief. It may be applied in various ways; by hot water bags, by hot poultices or hot fomentations; by hot mud; by hot baths; by counter-irritation with turpentine or camphorated oil or mustard; by friction with stimulating liniments, such as the old and well-known combination of menthol, chloral and camphor; or by ironing the painful part with a hot flat-iron, over a covering of flannel or paper next the skin. It seems probable that the virtues claimed for certain so-called antiphlogistic pastes depend even more upon their retention of heat than upon their chemical constituents.

3. *Purgation:* It is not intended to discuss here why certain remedies do good, and it may be admitted that there is no scientific reason why purgation should aid; but the fact remains that it does. The writer believes with others who have written in times past that there is a close relation between abnormal intestinal chemistry and attacks of muscular rheumatism. Such attacks frequently follow indiscretions in diet, such as over-indulgence in game or other meats or in pastries and sweets; though why this follows or what poisons or organisms thus find their way into the circulation, can not be definitely stated. The basis for belief in this relation is not only the fact that the attack follows closely the fault in diet; but also the relief afforded by thoroughly emptying the bowel. For this purpose some mercurial answers best; possibly because of an antiseptic effect in the intestine, possibly because it stimulates in some way the power of the liver to destroy poisons brought to it from the digestive tract. Blue mass or calomel acts equally well, but either should be followed by a saline, preferably magnesium sulphate. One other drug particularly efficacious is colocynth. A purge consisting of at least five grains each of blue mass and compound extract of colocynth, if given early after symptoms present themselves and followed several hours later by Epsom salts, until the bowel is thoroughly emptied, will go farther toward relieving an attack of muscular rheumatism than any other internal remedy; and this is true even though no previous indiscretion in diet can be traced as the probable cause.

4. *Salicylates:* It has been known ever since these remedies were introduced for the treatment of articular rheumatism, that they would give relief in muscular attacks; and this was one of the reasons for assuming the same name and a similar cause for one affection as for the other. Rosenow's work has shown that in many cases if not in all, streptococcal infection of muscle is the real cause; and salicylates, as internal antiseptics, are therefore as rational remedies for muscle rheumatism as for joint rheumatism. Whether they always work in this way, or whether as intestinal antiseptics or whether solely as analgesics, makes no material difference to the

patient who is suffering, and eager for relief. They do mitigate the pain and they are reliable agents to use following the initial purgation. Just at present acetyl-salicylic acid is the one most commonly prescribed; but sodium salicylate or methyl salicylate or the oil of wintergreen, may in an individual case prove more efficacious; or one of the newer synthetic products constantly being introduced.

5. *Opiates*: In severe cases a hypodermatic injection of morphine may be required to give relief; but this is exceptional, and it should be thoroughly understood that ordinarily all opiates are out of place, because they check elimination by skin and bowel and because they have in general bad effects that outweigh the good. Externally, however, the old-established lead and opium wash, applied hot over the affected muscles, is a most valuable aid in removing pain, combining the anaesthetic effect of the lotion with the soothing effect of heat.

Under the influence of these various remedies the ordinary case of acute muscular rheumatism gradually subsides after a few days to two weeks, and complete restoration to usefulness takes place in the part that was crippled. But instead of this happy outcome, a halt may be declared after a certain degree of improvement has been effected and the patient continues to have a constant interference with his muscular powers, more or less severe from time to time, persisting for weeks or months or years. This constitutes a different problem for treatment and calls for different methods of attack.

These are the cases notorious the world over as weather prophets, worse on cold and wet days, better in sunshine and warmth. They go about from one hot springs or one sanitarium to another, where they can get the benefit of mud baths, hot baths, hydrotherapeutic applications, massage and electricity. There is a well-established routine of therapy for such cases, available in institutions devoted to their care, but not quite feasible for use in private practice. No doubt much good is accomplished by (1) *massage,* in the hands of experienced and trained individuals in this branch of physical therapeutics; but training in these methods is not part of the physician's curriculum. (2) *Vibratory treatment* is closely related to massage and seems to stimulate circulation through the diseased part; when properly applied by those who know how it plays an important part in cure. (3) *Hydrotherapy* by douches hot and cold, sprays, packs and baths, is also a valuable aid in restoring the function of stiff and painful muscles, no matter whether they are so because of neuritis of posterior nerve roots, knots and indurations in the tendinous attachments, thickening of fibrous aponeuroses, or unabsorbed clots and inflammatory exudates in the muscle substance. (4) *Electricity* above all should be employed therapeutically by those alone who understand its use. By some the static wave current is praised as highly beneficial; by others, the ionization of remedies applied locally, preceding the application of electricity. But the proper manage-

ment of these methods is as much a matter for special study as the use of the X-ray, and they should not be employed by the ordinary medical practitioner until he has made himself familiar with their use. In fact, the equipment and apparatus for treatment by electricity, by hydrotherapy, or by vibration, requires so much space, to say nothing of cost of installation or of special assistants, that it can be only undertaken properly in institutions devoted to such methods. (5). *Counter-irritation* offers a modified means of accomplishing at home what the foregoing devices do at sanitaria. This counter-irritation, however, is not so fashionable as it used to be some twenty or more years ago, and is not commonly employed, perhaps because the cure seems to this generation worse than the disease. The various methods include what were called rubefacients, epispastics and escharotics. The rubefacients constitute the first degree and are still more or less in use, such as the regular and repeated application of mustard, or capsicum or turpentine, to redden the skin over the site of the painful muscles. The epispastics constitute the second degree, of superficial blistering, by cantharides plaster or by repeated coats of a strong tincture of iodine, in both of which the laity still have strong faith. The third degree, escharotics, includes remedies that cauterize; such as the moxa, of which the Japanese are so fond as a therapeutic measure; and the thermo-cautery, heated to a red heat, and applied in streaks or gridiron fashion over the obstinate areas that refuse to respond to simpler means. In this same group of counter- irritants for chronic muscular rheumatism should be included acupuncture for lumbago; and the seton for any form. Both of these resorts—the insertion of steel needles deeply into the muscles of the back, and the passage of a tape through a fold of skin and fat after piercing the latter with a scalpel, were favorite methods with our fathers in medicine, but now have become even more obsolete than venesection. All of these heroic methods of treatment for chronic muscular rheumatism have gone out of fashion, but it does not follow that they did no good.

At the present time, our most popular and most promising theory in all of these chronic ailments known as muscular rheumatism is that of local infection. This means that somewhere in the body, in every such case, there is a source from which toxins or micro-organisms themselves constantly enter the blood and continue to exert an influence upon various parts of the body, particularly upon muscle tissue and joints. This theory, put forward particularly by Billings, calls attention to tonsils, gums, carious roots of teeth, or sinuses about the face; prostate gland or Fallopian tubes; gall-bladder, appendix or large intestine; as possible sites of infection, which must be sought for and eliminated as a rational first step toward the cure of chronic muscular rheumatism as well as arthritic affections. There can be no doubt about the importance of this factor in etiology; or the value of its discovery and removal in therapy. Too many observations have already

been made in the matter, by many different men, to permit of skepticism. The removal of diseased tonsils; the cure of pyorrhœa; the discovery, by ordinary exploration or by X-ray films, of abscesses at teeth roots, and their eradication; the surgical drainage of infected sinuses; the repeated stripping of prostate glands containing infected secretions; or the removal of diseased tubes, gall-bladders or appendices, all have been reported as resulting almost magically in the relief of persistent, painful and incapacitating affections of muscles. As regards the intestinal tract, disinfection of this by overcoming stasis, by laxatives, by diet proper in quality and quantity, and particularly by the use of cultures of the Bulgarian bacillus, has likewise in certain cases proved highly effective in the treatment of chronic muscular rheumatism. All of these methods of therapy are rational because based upon proved etiology, and will probably be more and more the first thought, as time goes by, to the exclusion or at least to the great diminution of the older methods described.

BIBLIOGRAPHY.

[1] *Das Problem des Muskelrheumatismus;* A. Schmidt, *Medizinische Klinik,* Nr. 19, 1910.

[2] *Noch Einmal das Problem des Muskel Rheumatismus;* A. Schmidt, *Medizinische Klinik,* Nr. 16, 1914.

[3] *Der Untersuchungsbefund am rheumatisch erkrankten Muskel;* A. Müller, *Zeitschrift für Klinische Medizin,* Bd. 74, 1912.

[4] Fibrositis and Muscular Rheumatism; Luff, *British Medical Journal,* 1913, p. 856.

[5] Etiology of Articular and Muscular Rheumatism; Rosenow, *Jour. A. M. A.,* April 19, 1913.

[6] Etiology of Acute Rheumatism, Articular and Muscular; Rosenow, *Journal of Infectious Diseases,* January, 1914.

[7] Lesions Produced by Various Streptococci; Rosenow, *New York Medical Jour.,* Feb. 7, 1914.

DISCUSSION.

Dr. J. N. Hall said the diagnosis of lumbago has no standing until the patient has been stripped to make sure that there is no osteo-arthritis. No man with rheumatism should be treated until his rectum has been examined, and this examination should also include the prostate. All of these things must be excluded before a diagnosis of rheumatism should be made.

Dr. Cheney, in closing the discussion, said he wished to reiterate the point that the necessary preliminary to treatment, is to know what you are called upon to treat.

Speaking of comparative methods—the new and the old—while Dr. Cheney has much respect for vaccines, there are many times when you are obliged to give your patient some relief at once and cannot wait for vaccines. For this reason he has presented both the old and the new ways of treating lumbago. There is no harm in using what we have at our immediate command, while waiting to test our new means. He has found that many young practitioners just out of school do not know what to do in these cases unless they can resort to vaccines, and for this reason he has offered both the old and the new methods of treatment.

AN INSTANCE OF POTASSIUM IODIDE POISONING.*

BY REYNOLD WEBB WILCOX, M.D., LL.D., D.C.L.,

Formerly Professor of Medicine at the New York Post-Graduate Medical School and Hospital; Consulting Physician to St. Mark's, the Ossining, the Eastern Long Island and the Nassau Hospitals,

NEW YORK CITY.

Iodide punishment, thus named by Field many years ago, is familiar to most physicians of experience. In greater or less degree one expects it when medication is necessarily intensive and when reached, the results must be mitigated or the dose held at that maximum or probably and generally reduced.

The symptoms in the sequence of their appearance, are metallic taste in the mouth, nausea, salivation, respiratory catarrhs, gastric pain, intestinal cramps and irritation of the kidneys. Generally by the time gastric disturbances are established the cutaneous manifestations appear. Such are erythematous patches, with or without purpuric spots, papules, pustules, blebs and finally even furuncles.

Two groups of symptoms appear to be common to iodine punishment and to hyperthyroidism. These are: (1) Circulatory; palpitation, frequent pulse, warm and sweating skin, and (2) Nervous; tremor, vaso-motor disturbances, asthmatic attacks, insomnia and nervous exhaustion.

If the iodide cachexia is established we have atrophy of the breasts and testicles, general emaciation, and rarely severe, but possibly fatal marasmus. As soon as emaciation becomes pronounced, there is generally intense cardiac palpitation and often a ravenous appetite. All these symptoms result from the administration of moderate doses of an iodide salt continued over considerable periods of time, but they are not of serious moment. They may be mitigated by coincident administration of alkalies, by the use of boiled starch as a vehicle, by the chewing of pellitory; and five drops of tincture of belladonna with each dose will generally obviate the respiratory catarrhs.

The quantitative estimation of potassium iodide in the urine is easily determined by Hilger's test (which rather constantly yields too small results) or preferably by Kerstrung's method.

---

*Read by title.

Acute iodide poisoning is indeed of considerable rarity. The symptoms involving the alimentary system are: thirst, nausea, salivation, vomiting, griping abdominal pains and purging. In the respiratory tract; inflammation of nostrils (coryza) and frontal sinuses, swelling of the tonsils, fauces, and larynx. In this stage the eyes are suffused (conjunctivitis). In more severe instances, bronchorrhœa is marked and pulmonary œdema of high degree, with fever may supervene. Occasionally, the symptoms may resemble those of hay-asthma. In the circulatory system: palpitation, frequent and feeble pulse and fainting are observed. In the urinary system: albumin and casts are found in the urine, there may be œdema of the face and scanty urine which may go on to complete suppression. In the nervous system: headache, giddiness, tinnitus aurium, neuralgic pains, anxiety, convulsions, disturbed mentality and active delirium have been recorded. Death may occur from respiratory paralysis.

E. B., single, about 35 years old, had acquired syphilis ten years previously. The primary lesion had been recognized and, upon the appearance of the roseola, treatment with mercury had been instituted and carried out with reasonable thoroughness for about eighteen months, followed by the iodides for a like period. For more than seven years no symptoms or signs which would indicate the recrudescence of the original disease had been noted after careful and repeated examinations. So far as the methods in vogue at that time indicated, that he was cured of syphilis was a legitimate conclusion.

On Oct. 7th, 1909, he was found to be suffering from a moderate amount of conjunctivitis, coryza, with marked frontal headache, salivation, and cough with considerable muccous expectoration. The pulse was 96, respiration 22, and temperature 99.8° Fahrenheit. On careful examination, the heart was negative, the lungs showed no change of percussion or auscultation, excepting abundant, coarse, mucous râles. The urine was of a specific gravity of 1023, urea 2.3 per cent., and beyond a very distinct trace of albumin, increased urobilin, and a small amount of mucus, was absolutely normal. On the following day all symptoms were aggravated, the pulse was weaker, the respiration rate unchanged, but the temperature was 100.2° Fahrenheit. A specimen of the blood was reported to be absolutely normal by the Board of Health. On the 13th the symptoms and physical signs remained about the same. The urine was strongly alkaline, specific gravity 1020, with a trace of indican, urea 1.2 per cent., but otherwise normal. On the following day microscopical examination of the sputum showed that it was mostly mucus, with some fibrinous matter and but little pus. There were a few diplococci, such as might be found in any normal sputum, but no pathogenic micro-organisms. The chlorides in the urine were moderately increased, and it was still alkaline, of a specific gravity of 1023, containing 1 per cent. of urea and an increased amount of carbonates.

On the 15th the conjunctivitis, salivation, coryza and bronchorrhœa persisted, the pulse was 88, weak but regular, the respiration 22, and the temperature 100.2° Fahrenheit. The patient was nervous, restless and excitable. The heart sounds were weak, but no murmurs could be heard. Examination of the lungs showed abundant, coarse and fine mucous râles, and the patient was continually expectorating a clear, frothy mucus. On the following day the restlessness continued and became more pronounced, with the exception of an elevation of one degree more of temperature, there was no change in the signs. During the night he became somewhat delirious and made several attempts to get out of bed. His urine was found to contain iodine in large

quantity. After much questioning it was ascertained that he had been taking one-half ounce of potassium iodide daily, for several days, for just how long, his excitable mental condition prevented us from securing accurate information, but it was probably for more than a week. He claimed that he had taken an ounce that day; this, however, is doubtful. During the night he became more delirious and early in the morning the family called a physician, who made a diagnosis of "grippal pneumonia" and in the belief that sleep was an absolute necessity, gave 20 grains of hydrated chloral with 30 grains of potassium bromide. After some seven hours of more or less disturbed sleep, the physical signs and symptoms remained the same, excepting that the pulse became 120 and very weak. An examination of the sputum was negative for all bacteria. The urine showed a specific gravity of 1020, was alkaline, urea 1.1 per cent., chlorides enormously increased, and some carbonates, with plenty of iodine. No albumin, peptones, sugar or casts were found. A few triple phosphate crystals were found in the sediment. The fever, conjunctivitis, coryza, salivation and bronchorrhœa gradually subsided and coincidentally his restlessness. As the mucous râles diminished a ventriculo-systolic murmur loudest at the apex, was discovered, and this persisted for more than a year.

On Oct. 25th he passed 98 ounces of urine, of a specific gravity of 1015 (morning) to 1020 (night), acid in reaction, urea 1 per cent., chlorides normal, albumin, peptones, sugar, bile, and indicina absent, the urobilin was diminished. The sediment contained a very few hyaline casts, few leucocytes, a small amount of mucus, and few squamous epithelial cells. Vigorous interrogation on this date developed the detailed history so long missing and afforded a complete explanation of his condition. A friend of the patient had acquired syphilis at about the same time, perhaps from the same source. This friend had not been properly and thoroughly treated, and within the previous six months had suffered from a perforation of the hard palate, caries of the nasal bones, with a sunken nasal bridge. With this very definite result of uncured syphilis before him, he himself determined to take no chances. He had learned from another friend who had suffered from syphilitic myelitis, that from a half to one ounce of potassium iodide, taken daily, would work wonders. His information, however, did not include the fact that these doses are reached by degrees, while the patient is under the observation of a physician. In addition, he had recently become engaged to be married, and wished to be sure that the dread disease was "driven out of his system." So far as could be ascertained, he had taken half an ounce of potassium iodide for twelve days, the ounce dose which he claimed to have taken upon the last day of his self-determined treatment, is uncertain. The symptoms resulted from six ounces of potassium iodide distributed over twelve days, and had become marked enough for medical attention on the third day of administration. About a year after this episode, he married and in due course of time became the father of a healthy child which, so far as known, has remained healthy. He is firmly convinced that the fortunate result is entirely due to his having thoroughly cleared his system of syphilis by the method which he reasoned out and adopted with so much resulting commotion. He has been warned, however, that at present a method has come into use, unknown in practice at the time of his experiment, which determines the cure of syphilis with great accuracy, and that he is to recommend neither his theories nor practice to any of his friends who may have been in their past likewise indiscreet.

AN ETIOLOGICAL STUDY OF ASTHMA AS A BASIS FOR TREATMENT.

BY BERTRAM C. DAVIES, M.D.,

LOS ANGELES, CALIFORNIA.

That paroxysmal dyspnea, commonly called asthma, is not a disease, but a protest from a system carrying an overload while performing one or more of its numerous and complex physiological operations; that it does not occur as an entity, but always because of an underlying functional disorder as variable as that which produces headache, or the omnipresent female backache —this is both my premise and my conclusion. I state it thus frankly at the outset, asking that the reader accept it as a working hypothesis, which I trust the study undertaken at this time will amply verify.

Asthma has, heretofore, been designated as a disease presumably incurable, and our efforts to allay it have been directed toward the finding of a specific or "cure"; that we have failed is because we have attempted to treat a symptom only.

This very prevalent and incapacitating disturbance that has been oppressing man and beast almost since time began and is on the increase. Osler once called it the "disease of theories," and a perusal of the literature proves his statement, but theories are the pioneers that blaze the way through the wilderness to ultimate success.

Asthma is a physiological disturbance and has practically no pathology of its own. Such pathology as is found shows in the nature of a right heart dilatation or an emphysematous lung with some congestion of mucous membrane in the bronchial tubes.

From time to time contributions have been offered showing that certain anatomical and pathological conditions are producing asthma. For instance, Voltolini in 1871 reported that the removal of the polypi from the nasal passages would cure asthma. Immediately, asthmatics were subjected to nasal explorations, a practice which has been indulged in more or less ever since with very unsatisfactory results.

The etiology of asthma has never been compiled and probably will not be for years to come. Its eradication depends entirely on a known etiology in each individual case, and it must be studied from that standpoint if with any hope of successful radical treatment.

Many of the generally accepted theories regarding the causes of asthma must be either modified or discarded entirely before we are free to discuss

and study the etiology of asthma. These will be taken up in succession in this study.

Heredity.—Salter, who probably wrote the first real contribution on the subject of asthma, gives heredity credit for 40 per cent. of all cases. A general acceptance of, and belief in, this statement on the part of the profession and patient immediately produces the mental attitude of hopelessness, a most fatal and insurmountable barrier to possible remedial treatment.

In nearly three hundred patients, the writer has had no cause to reckon with heredity as a factor, and concludes that heredity is a poor defense behind which to dodge when confronting the batteries of this enemy.

Adam says: "Heredity and upbringing are so entangled that a differentiation is difficult"—a most illuminating statement. For instance, a bad upbringing along culinary lines with vicious results which include asthmatic attacks cannot with justice be charged to heredity.

Climate.—Almost as much abused as heredity, climate does not begin to play the part as a contributing cause of asthma that it has been credited with.

All over the world patients are exchanging locations, the one finding relief in a location where another met discouragement and despair. An examination of the patient and his living conditions, diet, exercise, etc., will almost always reveal the cause, regardless of place. A patient does not, as generally believed, wear out a climate, but has, as a rule, returned to his old and vicious methods of living. Of course, there are exceptions to this, but experience based on observation of a large number of patients justifies the statement. There is a very, very small percentage of patients whose asthmatic troubles we are justified in referring to this cause. True, there may be some underlying causes which a high and dry climate keeps in abeyance, and so the asthma is prevented, but the average asthmatic who changes climate and is helped, as a rule changes his entire mode of living, with nearly always an improved systemic elimination.

Season.—Reference to five standard works shows three in favor of winter and two of summer as the time when asthma is the more prevalent. The fact is that when an imbalance exists between intake and elimination, asthma will be found to increase, winter being the time when this generally occurs. A heavy meat diet, absence of fruit and fresh vegetables, less exercise, less water-drinking and consequently less perspiration, followed by a much lessened kidney and skin flushing, produces constipation with resulting asthma. Therefore, not the season, but the faulty life of the asthmatic should bear the onus. The mucous membrane is called into action in elimination. When it is subjected to heavier work, a congestion results, and we often find a turbinal turgescence and a highly irritated membrane throughout the nose and throat. This point will be followed up later.

Occupation.—Asthma is much more prevalent among the well-to-do than the working classes, because of sedentary habits in the former. Faithful following of a prescription calling for a daily round of golf or some other out-door exercise has cured many an asthmatic. Such patients, living in sections where winter interrupts out-of-door sports, unless they substitute some other form of exercise, find themselves, toward spring, beginning to wheeze and wish for warm weather. Then the long-suffering climate is blamed, whereas the facts are that elimination has been reduced to a low point, a toxemia has developed and asthma has followed.

Bouchard has shown that open air exercise increases elimination by the intestines, skin, repiration and kidneys. Asthma, as previously intimated, is not found among men and women whose occupations require plenty of outdoor exercise. Physiologists have for many years shown that a disturbed body metabolism, resulting from vicious diet, produces several alkaloids, which, unless eliminated as a result of severe muscular exertion, are productive of serious consequences.

Brodie and Dixon, in 1902, demonstrated the presence of muscarin in the intestinal canal as a result of decomposed albumin. Muscarin produces an asthmatic spasm. Its antagonist is atropine, and we find atropine to be our best general weapon in handling the paroxysm.

Sex.—The ratio between males and females changes with the different decades of life. In the first decade, while we find comparatively few cases, males predominate almost two to one. No satisfactory explanation has ever been offered for this. The second decade shows the sexes about equal, while the third reverses the ratio and females predominate. The fourth effects more males, while the fifth decade involves more females.

The second decade is the out-of-door athletic period in both male and female, and this is possibly a big factor in not only reducing the actual number of cases of asthma, but also in equalizing the sex ratio.

Adam has pointed out that the predominance of asthma in women during the third decade is due to the establishing of a home life of their own, resulting, on account of preoccupation, in a more or less careless personal dietary, lack of outdoor exercise, with consequent constipation and intestinal putrefaction. My own experience with patients seems to justify his statement.

During the fourth decade males begin to show the result of gastro-intestinal abuses, and the percentage of males proportionately increases.

The menopause has been charged with a multitude of sins, asthma included, and, indeed, statistics show that during the fifth decade the ratio is over two to one in favor of the women commencing an asthmatic life. This is the age when reproduction has ceased, when the muscles of the chest, abdomen and back relax and an atrophy sets in. Examination shows an abdominal ptosis, varying in degree from a simple gastroptosis to a com-

plete splanchnoptosis, and the resulting asthma may be accounted for in at least two ways: (1) Diaphragmatic irritation from gastroptosis, and (2) intestinal stasis and putrefaction with resultant toxemia because of enteroptosis.

An abdominal support made to fit properly and that will hold the abdominal wall in place, while it cannot return the organs to their normal position, does take off a large part of the strain and gives very postive results in the relief of asthma.

A typical case will illustrate some 22 cases thus treated:—

Mrs. D., *æt.* forty-three, healthy all her life; four children; all normal births. Asthma began moderately two years ago, increasing gradually in severity. Marked constipation, flatulent most of the time.

Examination.—General abdominal ptosis.

Diagnosis.—Asthma following abdominal ptosis.

Treatment.—Abdominal support, regulation of diet to relieve constipation. Relief followed at once and the case went on to positive cure.

This abdominal condition is found to exist in men in the forties in a surprisingly large percentage of cases of asthma.

Uterine malpositions are to be seriously considered as a very probable cause of asthma. A history showing the relation of asthmatic attacks to menstruation, together with a vaginal examination, will clear up the diagnosis in many cases. These are reflex occurrences, and while not as commonly encountered as some other causes, doubtless are a contributing factor in many more cases than are recognized. Ventral fixation has cured four cases in the writer's practice.

Nose.—Nasal conditions, as related to asthma, have claimed attention for many years, and much has been learned regarding their possible contribution to proxysmal dyspnea.

Patients whose nasal passages are blocked become mouth-breathers, and mouth-breathing asthmatics cannot be cured. The nasal passage must be considered and treated. At once the question of method arises. Anatomic malformations, such as septal deviations and spurs, call for surgery. Mucous membrane hypertrophies that have dammed nasal drainage and given rise to sinusitis are not to be ruthlessly cauterized and removed. The underlying cause must be discovered. Usually an intestinal toxemia coupled with poor elimination is the primary cause, and this must be corrected before permanent good results will be obtained.

The available statistics in this direction are legion, but vary so widely that one is forced to the conclusion that these patients have not been under observation for a sufficient period, following a nasal operation, to give the figures any real value.

Adenoids may play some secondary part in the production of an asthmatic seizure, but since they in turn have almost positively been deter-

mined to be the result of an imbalance in body metabolism growing out of dietary errors, their removal does not eliminate the real, though it may be the remote or obscure cause.

Mouth.—The fact that good healthy teeth are necessary to good mastication and gastrointestinal efficiency is obvious. The absorption that takes place from diseased cavities must not be overlooked.

Diet.—Here we reach what the writer considers the controlling element in the etiology and treatment of asthma.

The strongest proof of this is shown in the natural course of an asthmatic attack, during which the patient, as a rule, does not demand food, and after a few days' fast, the attack lessens and disappears. The pressing of food upon two of my own patients during the decline of an attack brought back the symptoms and prolonged the session.

In support of this position, I beg to quote Adam, who, in an article sent the writer (after seeing a previous paper by him on the subject) summarizes the question of intestinal physiology to further prove the part played by diet in the production of asthma, when he says, "Asthma is closely associated with excess of food, particularly of carbohydrate food, relatively to the individual's metabolic capacity and to the amount of his exercise. When these are properly adjusted to each other, the asthma ceases in most cases. Too much carbohydrate—energy food—may interfere with due metabolism of tissue foods and of the tissues themselves, especially in the absence of sufficient muscular exercise. If the less complex carbohydrate molecule is oxidized at the expense of the more complex nucleo-proteids, these will be imperfectly metabolized and give rise to such toxins as may cause asthma."

A careful investigation of the diet of asthmatics, as they present themselves, brings us to the conclusion that here we often find the crux of the situation. Correction of dietary errors is most necessary, and any attempt at treatment is likely to be futile which fails to reckon with diet. When faulty, experience has proved it to be a strong etiological factor in a great percentage of cases. Recognition of this truth at once clears the way, and radical treatment should follow, resulting in a preponderance of cures.

The treatment followed by the writer consists in providing the patient with a dietary that first of all lessens the quantity of food ingested and brings about a better balance between proteid and carbohydrate; fewer varieties of food at one meal and proper combinations, eliminating, for instance, such mixtures as fresh acid fruits and milk. Next he insists on more thorough mastication. Relief from constipation, if present, should be immediately attempted, either through diet or if necessary by the use of laxatives. The drinking of water at the proper time and in sufficient quantity is of no small moment. Well regulated exercises to aid elimination are an absolute necessity. Each

patient has his own individual needs and no routine can be laid down that will cover all cases.

The complications met with in asthmatics are usually found in the cardiovascular and renal systems, and decidedly increase the difficulties of the problem. They nearly always call for prolonged rest in bed and the regular diet usually prescribed for that particular class of patients.

The above notes are based upon the observation of some three hundred asthmatic patients during the past five years, and are offered as suggestive of the possibilities in the treatment of so serious a malady; there being many cured cases to offer as conclusive evidence that a varying etiology is the basis for radical treatment.

DISCUSSION.

Dr. W. W. Babcock said that he had operated a case of gall stones, also afflicted with asthma, and for a time the asthma was absent, but later on returned. We operated another case of gall bladder toxemia with asthma, and for a time there was relief from the asthma, but it later recurred. Now the question with me is, do the cases the doctor speaks of which, following operation have a lasting recovery from the asthma, recover reflexly, or is the recovery due to something we know nothing about?

Dr. McCleave replied that the relief which follows operation is often only temporary. Is it not possible that there are multiple sources of infection and that by removing one cause we give temporary relief?

Dr. Stewart added that asthma has been relieved by pollen extracts and vaccines.

Dr. Davies, closing the discussion: In operating we relieve the overload which always exists in the asthmatic state. When this takes place the asthma is relieved and as soon as the system gets caught up again, if there is another source of infection to cause an overload, the attacks will return, but if all of the sources of irritation and infection are removed the asthma will not return.

Diet and rest are absolutely essential; the patients are underfed for a while and a diet used which lessens the liability to attacks.

THE SESAMOIDS OF THE FLEXOR BREVIS HALLUCIS; THEIR IMPORTANCE.

A Surgical Precaution.

BY NOBLE PRICE BARNES, M.D.

WASHINGTON, D. C.

Every new business, occupation, pursuit, game, or gift occasions new morbidity and new mortality. Every excessive pleasurable indulgence wreaks its corresponding retribution of discomfort and distress. Consequently, today we find expressions of yesterday's intemperate

FIG. 1.—Showing sesamoids of the metatarsophalangeal articulation.

use of the feet in the too frequent and furious terpsichorean festivities, the sequel of the insanely popular hesitations, tangoes, fish walks, angle worm wiggles, peristaltic waves, and other forms of the dizzy whirl perpetually practised by the devotees of "Saint Vitus, that blessed patron of the dance."

One of these injuries has become sufficiently frequent to merit serious consideration, emphasizing the need of a more general knowledge of the importance and a better understanding of the anatomical relations of unrecognized or forgotten and neglected parts, not only for the early instituting of prophylactic measures, but for the employment of precautionary surgical procedure.

Of the sesamoids we have known little and cared less. Their demands for attention have been few, consequently our indifference and ignorance. But, as necessity is the mother of invention, so injury is the mother of investigation and research.

The pair of bones that give rise to this consideration deserve a more distinctive name because they are a constant and an intricate part of one of the most important joints of the body. As the patella is to the knee, so is this pair of bones to the great metatarsophalangeal articulation. In fact, this pair is of much greater importance, for the articulating surface of these bones is proportionately greater, their presence prevents anterior dislocation of the great toe, they sustain the weight

Fig. 2.—Adult sesamoids, showing ball-like protuberance.

of the body much of the time, they are the fulcrum of the foot, the pivot of locomotion, and the pulley of an important tendon.

The patella may be, by preference or necessity, occasionally called upon to support the body weight a few minutes, but its duties are insignificant when compared to the constant grind that must be endured by these lesser, unnamed, and unknown bones that were born to bruise unseen.

Anatomists are satisfied to give this set of bones, that should be given the dignity of a distinctive name, but passing notice. Exhaustive and even padded systems of surgery omit entirely even a mention of the subject, and in searching recent journal literature since beginning this investigation, I find but one article, a very timely one by Speed (*Annals of Surgery,* Oct., 1914), who writes of the Injuries of the Great Toe Sesamoids—"the one set in the series of sesamoids found

in the whole body" and "seldom considered either clinically or antomically."

Speed, whose edition of Gray may be as old as mine, makes the usual and accepted statement that "they are more common in males than females and also in those of active muscular habit."

Beckman in an article, "An Unusual Bone Tumor of the Foot," (*Surg., Gyn., and Obstet;* July, 1912) reprinted in the *Mayo Clinic* for 1912, writes as follows:

"Sesamoid bones are not uncommonly found in the sole of the foot. Gray's *Anatomy* states that two small sesamoid bones are found in the tendon of the flexor brevis pollicis opposite the metatarsophalangeal joint of the great toe, occasionally one in the metatarsophalangeal joint of the second toe, the little toe, and still more rarely in the third and fourth toes."

Gray further states "they are more commonly found in the male than in the female and in persons of an active muscular habit than in those who are weak and debilitated."

FIG. 3.—Boy, fifteen years old. Radiograph by Captain Christie, A.M.S.

In his last (fourth) edition of **Human Anatomy,** Piersol states that "sesamoid bones with the exception of the patella are not usually included in the description of the skeleton. They are small, rounded bones developed for the most part in the capsules of joints, but sometimes in tendons. Their function is to obviate friction and in some cases to change the direction of the pull of a muscle. The number of sesamoid bones is very variable, but the usual idea that they are, so to speak, accidental, depending on the mechanics of a certain joint or tendon, must probably be abandoned. . . . Those of the first metatarsophalangeal joint are large and constant."

Thilenius considers sesamoids "as real parts of the skeleton, all of which either are not developed or if they do appear are again lost in others."

J. J. Nutt, in his *Diseases and Deformities of the Foot,* writes: "These (sesamoid) bones are not accidental formations due to pressure (Bell), but have been found in the still born baby (Cross). They are essential to the perfect physiology of the foot."

Dwight, in his *Clinical Atlas,* Variations of the Bones of the Hands ana Feet, writes: "Bones sometimes called sesamoids are typical parts of the skeleton. . . . Sesamoids of the metacarpophalangeal joints and interphalangeal joints and the corresponding ones in the feet are much more numerous in the fetus than in the adult. . . . Most sesamoids have no particular function. . . . the two under the head of the first metatarsal are constant." Pfitzner has prepared a table illustrating the greater frequency of sesamoid bones in the hands of the new born. Thilenius, Keibel, and Mall give the thirteenth and fourteenth year as the usual time for

Fig. 4.—Girl, eleven years old. Radiograph by Doctor Clark.

the osseous centre to appear in the pair of sesamoids, and Thilenius states that this may not take place until after middle life. Hasselwander gives an earlier age, the eighth year in females and the eleventh year in males.

My findings are more in accord with this last anatomist, as shown by many radiographic plates. While the distinctive shadow is rarely seen under eight years in either male or female, it is equally rare not to find it after the tenth year. Their constancy and prominence is shown by all the plates taken at random of males and females from fifteen to seventy-five years of age.

These bones are, therefore, a constant and, when we consider their position, a necessary part of the human body. They are situated one in either head of the flexor brevis hallucis (Fig. 1). This muscle passes under the metatarsophalangeal articulation. Its inner head is inserted in association with the tendon of the abductor hallucis; the outer head is inserted in connection with the tendon of the oblique and transverse adductors. The muscle is not only a flexor of the metatarsophalangeal joint,

but a slight adductor as its origin from the cuboid is to the outer side of the middle line of the foot.

The bones are bound together by a strong fibrinous structure and capsular ligament, forming a groove on the under surface for the passage of the tendon of the flexor longus hallucis.

Without dwelling at length upon the varied and important actions of this muscle and tendon that can be found in any good book on anatomy, suffice it to state that the sesamoid bones must be present and the great metatarsophalangeal joint must be normal for its proper functioning.

The sesamoids with their fibrinous structure present a convex, ball-like surface that drops down about one cm., in adults, producing a protuberance that forms the ball or pivot or fulcrum of the foot (Figs. 2, 3, 4). The upper surfaces are concave to fit the two distinctive surfaces on the dorsum of the head of the great metatarsal bone (Fig. 7), and with

Fig. 5.—Showing fracture of inner bone.

their connecting ligaments and fibrinous tissue covered with serous membrane, enter into the formation of the great metatarsophalangeal joint. The inner of the pair is situated directly under the head of the great metatarsal (Fig. 1), while the outer extends beyond and shows on the radiographic plate like a tuberosity on the outer surface of the great metatarsal bone.

If every joint with its every movement is essential to perfect usefulness and perfect comfort, no more argument is needed for the presence of these sesamoids. Radiography has enabled us to trace to their origin many pain reflecting lesions and thus these bones have at times been found the seat of obscure and perplexing conditions. Injuries to these bones are the result of direct violence, and the extent of injury is proportionate to the force of the violence or the length of time of its continuance.

Thus, a heavy weight falling on the foot, the body weight being caught with great force on the ball of the foot, as in falling from a height or slipping while carrying a weight, or the twisting or slipping of the foot off the prong of an automobile clutch or brake, may fracture one or both of these bones completely. The inner bone situated directly under the head of the metatarsal, is the more commonly injured (Fig. 5).

The result of a serious trauma of this sort asserts itself with corresponding pain and tenderness, increasing with use. Disability, from resulting inflammation and sympathetically lame muscles, becomes complete.

More frequently in these days of constant dancing, hard floors and pavements, high heels and thin shoe soles, the trauma comes on gradually. Short rests and cold applications at the onset give relief, but on resuming the excessive glide under the hypnotic sway of the rhythmical rag and the

Fig. 6.—Showing exostosis.

spirit of 'on with the dance, let joy be unconfined," the heat and discomfort, pain and tenderness return.

Continuance of this indulgence produces a cellulitis, tenosynovitis, periostitis, tissue thickening, and sometimes exostosis (Fig. 6) and the corresponding lame muscles from unnatural walking.

Trauma of the tissues thus produced naturally enforces some form of rest treatment. To this rest treatment the attendant may add counterirritants, heat and pads. Often like many disorders of the aching feet, they are referred to a cobbler or find their way to pseudo scientists who profitably treat them for everything from weakened arch to arthritis deformans.

Rest treatment with well padded shoe soles will in some instances, give a measure of relief, but in all the inside appliances the prominent projection sinks through the soft pad or opening only to come in contact with a hard surface, and the effect is the same as that of a thin or badly worn

sole. The sensitive and subacutely inflamed parts are constantly being injured.

The plan I have devised to protect these injured bones is more effective. The shoes the individual has been wearing, the more worn and thin the better, are simply half soled with a good thick leather, cutting out the inner surface completely corresponding to the position of the sesamoids.

New shoes have the outer sole removed, corresponding to the position of the bones in question. A hole an inch or a little more in diameter is cut out sharply and completely to the inner sole. If the thickness of the sole is not enough to keep the sesamoids from touching the floor, an extra sole is applied cut out in the same way (Fig. 7). No inner pads are used, but the projection is permitted to make its own depression on the soft inner sole which acts as a hammock or drum head.

Fig. 7.—Showing articulating surface on dorsum of the head of the great metatarsal bone, showing plan devised to protect the injured sesamoids.

In fracture or trauma followed by exostosis open surgery is needed. The former may be treated in the same manner as fracture of the patella, or the exostosis may be removed without disturbing the joint.

These serious conditions, heretofore, have usually escaped recognition until the pathological changes and corresponding disability make complete removal of the sesamoids justifiable, as shown by the experience of Speed (*Annals of Surgery,* Oct., 1914).

In reply to my letter of inquiry, Doctor Speed writes: "The cases on which operation for removal of the bones was performed have been symptomless ever since, without exception. I consider it very important to allow enough absolute rest after operation, to have all irritation and inflammation subside, particularly that of the tendon sheaths. Two patients I have operated on are now doing heavy labor every day with no pain in the foot, one after two years."

In the article previously referred to, Speed gives the technic for removal of the sesamoids, stating: "They should be dissected out, both from the fibrous covering of the tendon, without opening the joint structure." The difficulty of this procedure is illustrated in Fig. 8, a photograph of the inverted joint in question.

To recapitulate: 1. The sesamoids of the great metatarsophalangeal articulation are a constant and necessary part of the human anatomy and deserve a name.

2. They are an intricate part of an important joint, having an articulating surface proportionately greater than the patella.

Fig. 8.—The inverted joint showing the difficulty of dissecting out the sesamoids without opening the joint.

3. They prevent anterior dislocation of the great toe.
4. They are the pulley of the flexor longus hallucis.
5. They sustain the weight of the body much of the time.
6. They are the pivot of locomotion.
7. They are the fulcrum of the foot, therefore ossa fulcra.

I desire to acknowledge the courtesy of Captain Christie, of the Army Medical School, and Doctor Clark, of the Casualty Hospital, for valuable services in radiography.

DISCUSSION.

Dr. Lewis H. Taylor said that he believed many of us fail to recognize this condition and treat our patients for weak arch, strained foot, etc. Dancing has finally brought this condition to the doctor's attention. Fracture is probably rare, but acute and subacute periostitis is common. Rest is the important thing. People who dance and bruise their feet refuse to take sufficient rest and ultimately we have a foreign body to deal with.

Dr. Robert T. Morris said that evidently he had neglected to study or appreciate the importance of these bones. He believed most surgeons have overlooked them. Probably it required some of these new dances to bring to our attention some of our anatomical defects.

Dr. Barnes, in closing, said when we have extra bony formation we can relieve irritation before we operate by the methods here presented. There are many people who normally have a large and consequently sensitive sesamoid prominence in the foot and who suffer a great deal. This tenderness, due to pressure, can be relieved by cutting out a part of the outer sole of the shoe as suggested. From his experience and from the anatomical relations here demonstrated, these sesamoids cannot be dissected out without entering the joint.

THYMIC DISTURBANCE IN THE ADULT.

BY GEORGE H. HOXIE, M.D.,

KANSAS CITY, MO.

On December 7, 1909, a young man was brought on a stretcher to the Bell Memorial Hospital and assigned to my service. He complained chiefly of weakness and of difficulty in getting his breath. We found him greatly emaciated, but with no gross pathological changes. For this reason the various physicians who had seen him had called it a case of neurasthenia; but the progressive emaciation and weakness belied their diagnosis. Six months previously, he had had his appendix removed. The symptoms for which this had been done were not made clear, hence we could not conclude whether there was any relation between that illness and the present one. But his story indicated that the present condition was a development of the bloating and eructation that set in soon after operation.

The temperature was subnormal (97.8° F.); the pulse varied from 54 to 120; the respiration varied from 16 to 26. The blood showed hemoglobin 100, white cells 7,600, red cells 6,860,000, blood pressure 120. The urine was acid, of specific gravity, 1,027, and contained a few short hyaline casts and squamous epithelium. The feces after castor oil were liquid, with some meat fibres and epithelium. The gastric contents after a Boas meal had a total acidity of 70, and free acid 36.

The physical examination was negative, except for a friction rub under the sternum and to the right and an area of dullness under the sternum and to the left, continuous with cardiac dullness but extending upward to the clavicle.

The patient had a morbid fear lest he be hurt. His reflexes varied from normal to exaggerated. The most striking symptom was holding his fingers between his teeth to "help him breathe." He spoke in a whisper; he could speak loud, only that it tired him. In general the picture was one of a severe myasthenia as well as of a neurasthenia.

He was put on a tonic treatment of nux vomica and iodide by mouth with succimimide of mercury intramuscularly. This showed no result, and was discontinued. Working on the assumption that the trouble was essentially glandular, arsenic was begun in the form of meta-arsenous acid anilid. This in turn failed to bring about a change (in spite of hot air baths given with it). Then the administration of thyroid in five grain doses three times a day was begun and in ten days the temperature ranged above normal

and the small lymphocytes had increased. After two weeks thyroid was stopped and he was given orchitic fluid tablets. This brought on nervous depression and discoloration of the scleræ, etc., and was stopped after a week. The thyroid was taken up again and accompanied by acetyl arsinilate intramuscularly. The patient immediately began to improve. After two weeks the thyroid was stopped and the Roberts-Hawley lymph and orchitic emulsion was injected. He continued to gain, especially in weight, and in six weeks was able to leave the hospital in apparently robust health.

The impression left on us was that the two effective agencies were the glandular extracts and the arsenic; and of the glandular extracts we attributed the greater force to the thyroid. As a result of the treatment, the patient's entire demeanor had changed and he seemed normal in every respect. The physical examination showed less dullness under the sternum. The friction rales had disappeared. The x-ray showed a smaller shadow in the thymic area. It hardly seems possible to question the diagnosis; for both the physical findings and the therapeutic effects pointed to a hyperplasia and dysfunction of the thymus.

On October 20, 1914, the patient appeared again, stating that he feared a recurrence because he had begun to bloat and be short of breath on walking. In all the time since leaving the hospital in 1910, he had been perfectly healthy. I went over him very carefully and found the same conditions as in 1909, except that the thymus had not increased in size as much as before. On doses of thyroid and arsenic he promptly recovered and was dismissed November 2, 1914. The x-ray showed only a slight difference between these two dates. He weighed 174 pounds on October 20th and 175 on November 2nd. He could not walk two blocks on the 20th and could walk uphill and twelve blocks on the 2nd, without becoming short of breath. The patient returned, May 8, 1915, saying that for six weeks his breathing had been bad when he walked; appetite good, bowel action good as long as he took the arsenic; sleep fair; no dizziness. He had stopped work thirteen days before, on account of weakness. He weighed 174 pounds, pulse was from 60 to 84, temperature 97.2° to 98.3° F., respiration 14 to 24, reflexes active. The substernal dullness at the level of ribs two and three was increased to the left. He was kept in St. Luke's Hospital, without an improvement until July. Then, as he began to improve, he requested that we try to remove the obstruction to his breathing, in order that he might not have a return of his trouble. Accordingly, on July 30th, Doctor Hertzler, under a local anasthetic, resected part of the manubrium and the first and second costal cartilages. A week later he opened the wound again and removed a glandular mass lying behind the junction of the second rib with the sternum. This was about three-quarters of an inch long and three-eighths inch in diameter. The patient recovered without a return of his dyspnea and left the hospital, August 22. By October 30, 1915, he weighed 188 pounds and felt well.

The tissue removed was of the glandular type, with cortex and medulla. Its position was correct for the left branch of the thymus. It was connected above by a sort of pedicle or isthmus. Hence we felt that there was little doubt of its being thymic tissue.

I saw another patient in October, 1913, in whom I made out a similar condition. Unfortunately I could not get her into a hospital for prolonged study and had to rely upon my office examinations. Her chief complaint was discomfort in the thorax and shortness of breath. She gaped nearly all the time she sat in my office and complained of the difficulty in getting her breath. The physical examination showed nothing except the thymic hyperplasia that could account for this weakness. Inasmuch as she refused to go into a hospital for treatment, she could not be helped materially, and a year later reported by letter—she lived out of town—that her condition was practically unchanged.

Another instance of thymic disturbance was in a young man who suffered at the same time a psychosis of fear. He had failed to make good in business. Physically the only definite findings, aside from the thymic hyperplasia, were the tonsils bound down and filled with cheesy masses. Here, too, I failed to obtain his admission to a hospital for prolonged study and had to rely on my office studies. The x-ray here confirmed the percussion dullness under the manubrium. The pulse was 116; the temperature, 98.6° F.; blood pressure 86 to 106; hemoglobin, 90; red cells, 6,248,000; polynuclears, 70. The urine was negative, the prostate swollen and tender.

Still another patient displayed a combination of prostatic disease with parathyroidism. In him there was again the substernal dullness, the weakness, and the difficulty in obtaining his breath. He had tetanic seizures with chills and fever. He cleared up quickly under prostatic massage and the administration of arsenic and thyroid. The thymic hyperplasia was confirmed by the x-ray plate.

In another case where a competent neurologist stated that there was a definite psychosis, I found again the syndrome of fear, weakness, difficulty in breathing, and thymic hyperplasia. There was here considerable vasomotor disturbance, evidenced by varying blood pressure. For example, the blood pressure varied in the two arms ten to fifteen mm., but cleared up under treatment. The neurologist, by the way, thought that the thymic hyperplasia might be the result of the psychosis—a result of functional bombardment—rather than that the thymic dysfunction might cause the psychosis. This patient had been treated by several men—including Christian scientists—with no results. He did improve under rest and the administration of arsenic and thyroid.

The problem presented by these cases is the familiar one of pluriglandular disturbance. To dodge the issue by calling the condition neurasthenia

or myasthenia does not assist in the solution of the problem, for that is merely giving a name to a condition. What we desire is an understanding of its pathogenesis. We shall have advanced one step in that direction if we can assure ourselves that the condition is due to a glandular unbalance.

This group of cases have in common the enlargement of the thymus. The first question is, therefore, whether the thymus is a gland with internal secretion, or simply a mass of adenoid tissue.

Warthin, in the second edition of the Osler-McCrae *Modern Medicine,* (IV, p. 906) expresses the opinion that the weight of evidence is increasing on the side of the adenoid nature of the thymus.

Yet the material brought forward by Matti, Klose, Hart, and others is practically all on the side of the glandular nature of the thymic body. This evidence might be summarized thus:

1. A disturbance in the growth of young animals when the thymus is removed. This disturbance seems to centre in the muscular and osseous systems and interferes with the normal increase in size.

2. A disturbance in the development of other glands—and an upset in the usual pluriglandular equilibrium when the thymus body is either removed entirely or becomes hyperplastic in the growing animal. Thus the hyperplasia of the spleen and adrenals was particularly well marked in thymectomized dogs.

The conclusions reached by the laboratory workers seem well summarized by Hart at the end of his studies of the thymus in *Virchow's Archiv* (214, p. 2):

> There is a true persistence of the thymus, and a true hyperplasia of the thymus, with which there appears often, perhaps always, not merely a hyperfunction, but rather a dysfunction of the gland. They are the expression and some part of the phenomena of an abnormal constitution, of a disturbance of the equilibrium of the pluriglandular endocrine system, on which as a basis various disease forms may develop. From the hyperplastic thymus a toxic influence seems to be exerted on the heart. The existence of a true status lymphaticus has not yet been proved with certainty. Rather, it appears as if the swelling of the lymphatic apparatus represents a tissue reaction that is dependent upon the thymus and which can show itself in the lymphoid components of the thymus itself. Two sharply marked histological types stand out: The so called medullary hyperplasia, which represents a primary increase of the specific organ tissue; and a hyperplasia of both zones in nearly normal relations, which argues for a secondary increase of the nonspecific lymphoid elements of the gland in a (usually primary) hyperplastic thymus.

Barker, in the January *American Journal of the Medical Sciences,* discusses the endocrine functions of the gonads in the male. Both of the case histories that he gives were of thymic hyperplasia. They are of interest here in that they show the participation of the thymus in the endocrine disturbance, and to that extent show that the thymus is not merely lym-

phoid tissue. An interesting comment on this question is made by Culbertson in the *Monthly Collective Review* for July, 1914:

On the relation of the thymus gland to the general metabolism but little has been worked out. Whether it inhibits the development of the ovary or whether such a development follows on the withdrawal of the thymus secretion is indefinite. Experimentally, it is increased after oophorectomy, as is the pituitary gland, before puberty. With the hypophysis it controls the growths of the body structures in general and with the pineal gland it probably prevents sexual precocity.

Lerch, in the *Medical Record* for April 11, 1914, has this to say:

For many years I have often found a dullness over the upper portion of the sternum and to its sides (in adults—G. H. H.), which it was difficult to explain, and like others, I have taken it for aneurysm of the aorta, enlarged bronchial glands, or tumor. Five years ago, I was able for the first time to percuss the exact borders of this dullness in a neurasthenic, a brother of a patient suffering from exophthalmic goitre, and diagnosed it as intracostal thyroid, on account of its resemblance to a substernal struma. However, finding this dullness constantly in hysterics and neurasthenics, the only patients which at that time I examined for this purpose, and soon being able to determine with accuracy the large vessels, I had to come to the conclusion that it corresponded to and represented the old thymic tissue, excessively filled with blood. I was forced to this conclusion by the form of the dullness, which exactly corresponds to the form of the thymus, and further, because it clears up considerably in the horizontal position of the patient whether or not he lies on his stomach or on his back, and increases in the upright position. In many patients it is visible, full, protruding, and frequently red. Occasionally distended veins may be seen in it, which empty when the patient resumes the horizontal posture, the ribs are flattened and the intracostal spaces sink. Almost in every case it is marked like an organ on the chest wall and can often be mapped out with the dermograph before percussion is made. I found enlarged thymus dullness so frequently associated with hysteria and neurasthenia and enteroptosis that I described this symptoms complex as a distinct disease (see Lerch, *Medical Record,* March, 1909).

These excerpts indicate that there is reasonable ground for believing in the glandular nature of the thymus, even if some of the effects are due to the pressure of the body on the surrounding tissues.

The next question is one of etiology. Are thymic disturbances in the adult—at any age when the gland is normally quiet—due to infections or inflammations in the anterior mediastinum, or are they responses to constitutional or glandular disturbances at a distance from the thymus?

In my own cases the causes seemed to lie a distance from the thymus. For example, in a patient whose history has not been outlined above, where the peculiar myasthenia plus dyspnea was present, the causative factor was a beginning pregnancy.

In some males also a sexual disturbance seems present, for instance, an epididymitis. But I should hesitate to say that sexual upsets are always at the base of thymic disturbances. I believe, therefore, that the types of thymic disturbance that I have seen are due to upsets in the endocrine system rather than to local conditions in the thorax. For such a view I find some support in the literature.

For instance, Doctor Halstead's discussion (*Bulletin Johns Hopkins Hospital,* Aug., 1914) of the influence of the thymus in cases of exophthalmic goitre argues the position that an upset in the sympathetic or vagal system brings about a loss of equilibrium, and that in response to this loss of equilibrium the thymus is drawn into renewed activity. Similarly, Doctor Hertzler's report that Graves's disease was frequently due to pelvic disturbance would argue by analogy for the same conclusion. Lerch (*loc. cit.*) thinks that enteroptosis is always associated with the syndrome and may give rise to it. In my cases, however, enteroptosis has not been a constant feature. And even if it were I should still be inclined to look for the cause of the atony leading to the symptoms generally classed under enteroptosis. For we know that enteroptosis gives symptoms in only a small proportion of the cases where it is present. The "something" that brings about the disturbance should be looked for as the cause. This something is probably the exhaustion following disease or overwork or excesses.

The diagnosis of the condition rests with the finding of an enlarged thymus in patients complaining of shortness of breath and extreme weakness. The variability of pulse and blood pressure, the subnormal temperature, the atony of the gastrointestinal tract, in patients showing no evidence of organic disease are all additional symptoms pointing to the endocrine dysfunction.

We usually notice the dullness when percussing the manubrium sterni. If the dull area extends out a half inch or more on either side of the manubrium, and if the manubrium is duller than the corpus, we need to proceed with differential tests. Gentle percussion rather than the strong type is of course necessary in order to make out a body so closely adherent to the posterior surface of the bone. Under such ordinary percussion the dull area is that of a triangle with its base just below the interclavicular notch and its apex between the junctions with the sternum of the second and third ribs. The aortic dullness does not reach as high as the centre of this area and does not lie as symmetrically under the sternum. An intrathoracic thyroid might give similar dull area, but this could usually be found to extend above the interclavicular notch and move with the act of swallowing. Aneurysms of a size sufficient to cause substernal dullness should give also a thrill or a pulsation.

The fluoroscope should be used to verify all cases where the percussion would indicate thymic enlargement. This is rather delicate work, depending as it does on our having our visual accommodation attuned to the dark room and further on our familiarity with making out semiopaque masses. The questions that should be kept in mind when we see a mass under the sternum are: 1. Does it have a movement of its own? 2. Does it have a definite form through which the bones show more indistinctly?

On the matter of motion we should try and make out the pulsation of the aorta and note whether this mass has a similar movement. If it does not, we have the patient pant with his diaphragm (*heckeln wie ein Hund,* Schütze) to bring out any motility different from that of the surrounding bones. He should also be made to swallow to bring out the motion of the thyroid.

Many patients show up the sternospinal region so obscurely that unless look at the dimming of the bone shadows we are unable to outline any semiopaque mass.

The plates are of less value than the fluoroscope because they cannot show these semishadows unless they happen to be made with just the right exposure and the right development. For this same reason it is difficult to secure convincing prints of these cases. We must therefore depend chiefly on the fluoroscope for our x-ray study of patients where thymic hyperplasia is suspected.

The treatment of the condition demands first of all rest and forced feeding. This of course involves attention to the emunctories and the environment. The medicinal treatment calls for the use of arsenic in heavy doses, such as we can get by the intramuscular injection of acetyl arsanilate or sodium cacodylate. The oral administration of arsenic is usually a failure. I find that I can give one to two c. c. of a ten per cent. solution acetyl arsanilate every other day with noticeable effect.

It would seem as if the thyroid gland furnished the best material to permit the thymus to sink back into quiet. Because of the contradictory reports from the various experiments and theorists, I have had to work this out by trying out the various glandular extracts at our disposal. We should suppose that the adrenal extracts were of particular value, but thus far this hypothesis has not been verified clinically.

DISCUSSION.

Dr. M. L. Graves, Galveston, Texas (by invitation) said he would like to ask what the doctor thinks of a sign which Dr. Boggs has described, viz., the shifting upward of dullness when the patient flexed the head backward?

Dr. Lerch has written many interesting things about percussion. He claims to make out the variations in the thymus gland during periods of congestion, and also had been able by percussion to outline all the variations in kidney dullness. Dr. Graves has not been able to confirm the percussion researches of Dr. Lerch, though it is perfectly possible to do so and he has not infrequently been able to secure correct outlines of enlarged thymic glands, which were confirmed by X-ray or by post mortem. He has been able to percuss a number of these enlarged glands in patients who have had neurasthenic symptoms, with visceroptosis, intestinal stasis, constipation, etc., but he had not been able to get any marked results from the administration of thyroid extract. He had seen patients presenting the fatigue neurosis and the fatigue electrical reaction of Jolly and Murri with enlarged thymus gland and some enlargement of the lymphatics, but no improvement from the use of thyroid extract resulted.

Dr. Morris said that whenever any of the ductless glands are disturbed then all are disturbed. One gland is a link in the chain of ductless glands. There is a tendency to ascribe all trouble to one gland, but we must look at them all.

Dr. Pottenger enquired what about the persistence of the thymus in adults?

Dr. Hoxie, in closing, said that in his cases movement of the gland was not present. Any movement which he discovered was not the thymus but the movement of the arch. In true thymic hyperplasia the gland is fixed.

Enteroptosis was not present in his cases and he did not believe it probable that there is any close relation between enteroptosis and thymic disturbance. There are certain cases which we are forced to designate as "neurasthenia" which we find are due to some glandular dysfunction. In these cases he has given arsenic, intramuscularly, and a distinct change in the patient for the better has followed.

In replying to the question as to the persistence of the thymus in adults, Dr. Hoxie said that this gland does persist. It has been found up to the age of 60 or 70. Investigators agree that its tissues are brought into renewed activity by disturbances elsewhere in the body.

THE RELATION OF UROBILIN AND URIC ACID EXCRETION THROUGH THE URINE IN SOME METABOLIC DISTURBANCES.

A Preliminary Report.

BY GUSTAV BAAR, M.D.,

PORTLAND, OREGON.

From a careful study of twenty selected cases the following conclusions were arrived at:

1. In all gouty disturbances urobilin was found constantly present in increased amounts in the urine;

2. Urobilin reactions were increased before the onset of the gouty attacks;

3. Urobilin decreases gradually and disappears on administration of alkaline-saline waters.

4. With the disappearance of the urobilin the gouty attacks subside, the uric acid simultaneously increasing in quantity in the urine as a rule.

5. Other possible causes for increased quantity of urobilin in the urine, like intestinal hemmorrhage, intestinal stasis, intestinal putrefaction, etc. have been considered and ruled out in the study of these twenty cases.

6. A disturbed liver function is one of the active factors in producing gouty attacks; the urobilin excretion being used as an indicator of impaired liver function.

7. The therapeutic indications for treating metabolic disturbances on the basis of these findings.

---

*Read by title. Author's abstract. Charts to be exhibited at the next meeting of the Society.

LONGITUDINAL INVERSION OF THE COLON.

BY ROBERT T. MORRIS, M.D.,

NEW YORK, N. Y.

The operation of Lane for short circuiting the colon, and the operation of colectomy are both rather severe procedures. Some of us have been experimenting with methods which would accomplish the same practical result, so far as removing colonic toxic influences were concerned.

There is no doubt but an entirely new vista has been opened by Lane, no matter whether we accept his rather enthusiastic views or not. Any pioneer with imagination needs watching. He likewise needs critical attention of a good sort for that part of his work which is new.

The study of focal infections is one which is to engage the attention of the medical profession more and more. In this line of observation we are to find explanation not only for infections of the joints and for certain obscure lesions of the vital organs, but we are to bring up the whole question of physical decadence under microbic influence. We are to determine the extent to which focal infections are responsible for distant constitutional effects.

There is no question but the colon carrying an excess of bacteria of many kinds has been responsible for distant effects to an extent of which we were not cognizant in the past.

The prompt relief or disappearance of some of the neuroses, and even of some of the psychoses as a result of some of the more severe operations of the school of Lane, will stimulate us to devising milder means for attaining the same end.

As a matter of fact there are one or two charlatans who have seized upon the idea of thorough colonic flushing, and who are obtaining practical results, which are by no means to be overlooked by members of the regular medical profession.

Some years ago Blake devised a method for infolding the wall of the distended cecum and it seemed to me that we might extend this idea to include practically the whole colon, leaving simply room enough for the passage of mucus.

When we are to dispose of the colon in this way, it is desirable to make a short circuit of the bowel between the cecum or lower ileum, and

a part of the sigmoid colon. This first step is accomplished in any one of the easier ways.

The next procedure consists in carrying a silk or linen suture in mattress form between two lines of longitudinal muscle of the colon in such a way as to invert the wall of the colon and to retain it in the folded-in position. This procedure narrows the lumen of the colon longitudinally, but we at once perceive a tendency for pouching of parts of the colon which lie between longitudinal muscle bands. They bulge and escape from the suture. In order to overcome this feature a suture is introduced which is called the accordion suture illustrated by this drawing on the blackboard. The accordion suture traverses two or more protruding colonic pockets and then is brought back upon itself in such a way that when the suture is tied these pockets are compressed very much as the folds of an accordion would be compressed when the instrument is closed. A series of the accordion sutures introduced rapidly just beneath the peritoneum or through the muscle coat, not only disposes of the bulging parts of the colon, but it shortens the bowel very decidedly.

The procedure is not practical for patients who have a fat, heavy omentum, or large masses of fat epiploic appendages. This condition, however, is one which we are not so apt to find in the class of patients who are suffering from chronic colonic toxemia. They are more apt to be of the thin nervous type.

One will sometimes find it necessary to divide one leaf of the great omentum in order to carry the suture properly, but when the omentum is thin and devoid of fat such division is not necessary.

The question which arises in my mind is whether these sutures will remain permanently in place, and if the adhesions which follow suturing will maintain the bowel in its new form? We all know the natural tendency for structures to return to normal conditions. In cases in which I have employed this method the colon apparently has not as yet escaped, but I have no way of determining that point.

Patients have been benefited immediately as a result of the operation, but I cannot as yet state that the benefit is greater than that which would follow an ordinary short circuiting operation, without the added feature of colonic inversion.

The subject is brought before you at this time in order to allow members of the Society to add their data when the times comes for making a fuller report upon the subject.

COLONIC STASIS.

BY GEORGE H. EVANS, M.D.,

SAN FRANCISCO, CALIFORNIA.

While the conditions of the abdomen and colon productive of stasis have engaged the attention of anatomists for many years, it is only through the modern development of Roentgen technic that we have arrived at a position where these malformations and pathologic conditions can be demonstrated with such a degree of accuracy that a reasonable hope has arisen for a logical plan of treatment which will result in permanent relief for a large number of these sufferers.

Modern literature abounds in historical and experimental contributions; the influence of adhesions, membranes, kinks, visceroptosis, and bacterial infection, as causative factors, has been the subject of discussion at almost every large convention for the last few years; surgical versus medical treatment has been thoroughly presented by the advocates of each. The fact that as yet no unanimity of opinion as to treatment exists is because the results attained with all forms of treatment, have not been sufficiently successful to demonstrate a practical plan of procedure, applicable to any considerable number of these sufferers. The principal reasons for this are the following: *First,* insufficient importance is attached to the necessity of thoroughly studying the true pathological condition in each individual case. Roentgenology has brought to us much help in this direction, but, because of poor technic and superficial interpretation, it frequently proves a broken reed on which to bend our pathologic study and therapeutic effort. *Second,* the significance of mechanical obstruction, whether due to membranous adhesions from whatever cause, kinks, megacecum, cecum mobile, or extreme degrees of ptosis, has not been given its proper interpretation. *Third,* the relation of cause and effect between ptosis and stasis has been largely erroneously interpreted. That extreme degrees of ptosis are not incompatible with normal physiological function of the colon, must, I think, be admitted by all who have studied large numbers of serial roentgenograms of the bowel. On the other hand, stasis, with its resultant pathology, through bacterial and toxin activity, is probably a frequent cause of ptosis. The recent interesting experiments of Murphy and Brooks[1] have clearly shown the presence, in the content of the

obstructed bowel of dogs, of a toxin, the result of bacterial growth, which when absorbed in sufficient amounts, produces definite symptoms, pathologic lesions, and death. Of the pathologic lesions produced by such bacterial action, chronic colitis and pericolonic adhesions are the most important and frequent. That pericolonic membranes can be produced by stasis through the agency of bacteria has been abundantly proven; in fact, bacteria pass from the intestinal canal to the peritoneal cavity with comparative ease.[2] Eastman[3] emphasized this fact at the American Medical Association meeting last year, and called attention to the presence of delicate, vascular membranes about the cecum in nearly all cases of chronic appendicitis with stasis.

Admitting then, the existence of a causative factor for many pericolonic adhesions in bacterial action incident upon a pre-existing stasis, our therapeutic effort must be directed along somewhat different lines than heretofore. Such adhesions are merely a part of the vicious circle starting from a more remote cause, and treatment, in order to be permanent in its results, must be undertaken with a more thorough comprehension of those underlying conditions, which were originally responsible for the anatomical abnormalities, which have been so prevalently considered the starting point. It is obviously useless to expect results from the separation of peritoneal bands, the direct result of bacterial action attendant upon a pre-existing stasis, and at the same time ignore the factors, upon which this stasis originally depended. It would appear that the truth of this statement is emphasized in the light of the frequent failures following the attempt to deal with such conditions by surgical treatment alone. I do not wish to be understood as unqualifiedly condemning the surgical treatment of all conditions on which stasis depends. Dense adhesions, the result of peritonitis, frequently constitute the cause of a stasis which can only be permanently relieved by removal of such obstruction. A chronic appendicitis with dense inflammatory adhesions fixing the cecum to contingous structures and thus producing stasis, can only be relieved by appendisectomy and dissection of all constructing structures. I wish, however, to deprecate the tendency, so prevalent in certain quarters, of seeing only the mechanical obstruction, which while intensifying the pathologic condition, is frequently the effect, rather than the cause.

The increased conservatism recently evinced by surgeons of large experience in this work has been indeed insignificant. Coffey, of Portland, in a valuable communication to the California Academy of Medicine this year, as yet unpublished, called special attention to the relatively small proportion of these cases that are truly amenable to the surgeon's knife, and with equal candor emphasized the success attainable by patient and thoughtful study of the individual case and an intelli-

gent application of dietetic, hygienic, mechanical, and medicinal agencies on the part of the internist.

This growing conservatism is all the more evident when we consider the results of the application of those more formidable surgical procedures of Lane. Short circuiting the bowel, by means of an ileocolostomy or ileo-sigmoidostomy, sometimes in addition, partial or complete colectomy, has claimed the attention of surgeons since 1909. The spectacular results reported by Lane, have induced many surgeons in this country to adopt these procedures in conditions of colonic stasis. The results, however, have not been uniformly such as to justify the general application of these heroic measures. Subsequent Roentgen examinations have repeatedly demonstrated the fact that the terminal ileum after ileocolostomy, frequently took on the character and function of a cecum, and became much dilated and impacted. Reverse peristalsis, or backing up of intestinal contents into the blind gut left where colectomy is not done, has also often proven a cause of impaction, and consequent absorption, producing a condition far worse than before operation.

Leaving aside the consideration of the function of the colon, which Lane and his followers seem to ignore, the results following these operative procedures and the attendant dangers accompanying them, necessarily place them as a *dernier resort* rather than a routine procedure. Mayo has well said that the number of persons whose condition warrants the risk is comparatively small and with candor deplores "the widespread adoption, by the medical profession, of surgical measures for this or allied conditions, while it is in the experimental stage, with little evidence to show that the supposed cures are permanent."

Indeed, those who implicitly follow the teaching of Sir Arbuthnot Lane in the treatment of this condition may well pause and reflect on the significant statement recently made by him:[4] "Doubtless at no distant time, many of the toxic conditions that arise in consequence of stasis may be met by means other than operation. If colectomy has done no more good than to point the way to the physician it has more than fulfilled its expectations."

In what manner then, can we meet these conditions by therapeutic measures, that may be expected to give satisfactory results in a considerable proportion of the cases?

That the cecum, ascending and transverse colons, have function, both digestive and absorptive, is, I think, admitted generally to-day by physiologists. Were man solely a carnivorous animal, this important organ could be dispensed with, and indeed he would be better off without it, for without doubt, poisonous substances are developed by the decomposition of unassimilated animal food in an organ, which largely

possesses the power of handling vegetable food and fluids. The evolution of man, however, has resulted in an omnivorous animal, and probably the best evidence of the necessity of a colon is seen in those post-operative cases where Roentgen examination has shown the adaptability of nature to meet the requirements of the individual, by creating out of the terminal ileum, an organ essentially a cecum.

It will be at once obvious that the first requirement in the handling of these patients must be dietetic. A diet rich in vegetable food, particularly the coarser vegetables, with a large cellulose content, must be the first consideration. Preparations made from bran, while of negligible nutritive values, yet go to make up bulk in intestinal content, and are thus of service. Agar-agar, which has the physical property of absorbing and retaining moisture, will aid in preventing the impaction of feces where stasis is present. This can be incorporated into the ingredients of various food stuffs.

Exercise, both general and applied to the abdominal muscles, is probably next in importance to the dietetic treatment. I wish to emphasize the necessity of special training on the part of those to whom is entrusted the important work of carrying out the technic of the mechanical treatment of stasis. These patients are not only those for whom institutional treatment is necessary, but this treatment can be carried on satisfactorily only in institutions where specially trained assistants can be obtained. Failures almost invariably follow the attempt to procure results by placing such patients in the hands of the average masseur. This is probably the chief reason why so many of these sufferers, by disappointment and desperation, fall into the surgical class, when a more enlightened and thorough technic in dietetic and mechanical therapy would have resulted in cure for many. I do not wish to place myself open to the charge of creating another specialist in this age and time when specialism in medicine is fast reducing the family doctor to a position of "medical broker," but I maintain that it is not just to this large class of sufferers to drive them to the operating table, when an intelligent treatment carried out by those who have rendered themselves competent, by thoughtful application to the mechanical principles underlying such treatment, will in the majority of instances avoid surgical measures.

Drugs do not occupy an important place in the treatment of chronic stasis, with the exception of those cases where the condition is dependent upon a spastic condition of some portion of the colon, where antispasmodics, of which atropine is probably the most useful, have their place.

We owe much to Lane for having brought to the attention of the profession the value of the use of liquid petrolatum. Its virtue is due to

the fact that it is practically a non-absorbable oil, and if given when the stomach is empty, serves as a lubricant to the intestinal tract, preventing in a large measure, fecal impaction. It renders its best service when given in sufficiently large dose early in the morning and on retiring. For the same purpose oil enemata at bedtime are of service in individual cases.

Cathartics, save at the very beginning of treatment, and to meet occasional conditions which demand prompt clearing of the intestinal contents, should be completely eliminated from our therapeutic regime.

Abdominal corsets and belts, or adhesive supports to the abdominal wall, have value in increasing intra-abdominal pressure and thus improving the circulation and relieving congestion in the abdominal viscera. Further than this, these devices are of questionable utility, and can no longer seriously be regarded as a means of directly relieving and replacing ptosed viscera.

The bacterio-chemistry of the intestinal tract remains as yet a chapter of romance; and yet it is to an elucidation of the conditions caused by the intestinal flora that we must bend our endeavor, if we are to attain to a satisfactory specific therapy of the underlying causes of many of our cases of intestinal stasis.

Leaving out of consideration the question of bacterial cause of many peri-colonic adhesions, the significance of the role played by the bacillus adhæsioformis described by Bassler,[5] and other bacteria in the causation of these membranes, the fact is abundantly attested by the brilliant experiments of Murphy and Brooks, referred to earlier in this paper, and many others, of the importance of the part played by bacterial infection in the etiology of intestinal stasis.

Much has been claimed by some investigators from the use of autogenous vaccines, but it has seemed to me that there has been little theoretical basis for the assumption of great therapeutic success in this direction until a better technic can be devised. Vaccines made from colon bacilli as usually obtained from the stools possess little virtue by reason of the fact that such bacteria are usually of very low virulence, in fact, are frequently merely saprophytic.

On the other hand there is much to be expected from a more thorough study of the flora of the intestinal tract, and from the use of autogenous vaccines prepared from the intestinal discharge obtained from the proximal portion of the colon after a complete cleansing out of the distal part.

The appended case reports will serve to illustrate a few of the conditions contributing to stasis, which I have endeavored to describe in the foregoing paper.

Case I. J. W., Pharmacist. Aged 50. She was very ill of typhoid when nine years of age. Had two attacks of diphtheria. Had several attacks of tonsillitis, the last

one five years ago. Appendectomy, 12 years ago. Hysterectomy 10 years ago. Had been much troubled with mucous colitis for many years, and for seven years had not had a bowel movement without the assistance of cathartics. For more than two years she had been anæmic, somewhat dyspnœic, and weak, without headaches or dizziness. Two weeks before coming to me she had a sudden, severe pain in the right upper quadrant, which came on about two hours after eating, without nausea, vomiting or jaundice. It lasted about an hour and was relieved with heroin. Gall stone colic was diagnosed.

Examination revealed a patient of rather anæmic appearance. Skin much pigmented on hands, face and back. There was a flat, unhealthy looking right tonsil and considerable pharyngitis with a large amount of lingual lymphatic tissue. The chest was negative. Blood pressure 150. There was some tenderness over the right upper quadrant of abdomen and the cecum.

Stool examination showed a well digested, brown, liquid stool with large amount of mucus, about equal parts of mucus and fecal matter. Microscopically many yeast cells, fatty acid crystals, some fat globules, few starch granules but no muscle fibres. Reaction strongly acid. Occult blood absent. No parasitic ova were found.

X-ray plates showed a slightly ptosed stomach, somewhat to the right, but otherwise normal. There was marked ptosis of the cecum, which under the screen was seen to be freely movable. It was seen in the 24 hour plate very much distended, approaching the proportions of a megacecum. Most of the bismuth was in the ascending colon and cecum. There were distinct nodular bismuth shadows in the transverse colon, suggestive of a spastic condition there. In 48 hours the cecum was still much distended but considerable bismuth had passed into the descending colon. The relative position of the flexures, showing the ptosis of the hepatic flexure is well shown. Following the 24 hour plate, the patient took cathartics, which is interesting in view of the distended cecum in the 48 hour plate. In 72 hours the cecum still contained bismuth and not until 96 hours was the bismuth entirely in the rectum.

Treatment: Dietetic, exercise, colonic massage, abdominal exercises, oleum petrolatum. No cathartics were allowed. Improvement practically immediate. Bowels have moved regularly unaided since early in April, when treatment was instituted. Improvement has been continuous.

Case II. Mrs. F. G. B. Aged 52; housewife. For 14 years has had attacks of dizziness accompanied by headaches. She has complained of stomach trouble for many years, particularly of gas which appears some hours after eating. She is not markedly constipated, though she has been in the habit of taking cathartics frequently. She has had some chronic articular trouble in the phalangeal joints of her fingers.

Examination showed a well nourished woman, slightly obese. Pulmonary and circulatory systems showed nothing abnormal. There was some thickening of the terminal phalangeal joints. Abdomen is prominent with flaccid wall. There is some tenderness in the epigastrium. Liver and spleen not palpable. Careful examination of eyes and ears shows nothing to account for dizziness. Stool is well digested and normal in appearance both macro- and microscopically.

X-ray plates show the stomach, pylorus, and duodenum normal. Stomach is empty in six hours and colon is seen high and hypertonic with bismuth as far as the splenic flexure. There is marked spasticity of the colon, which is well seen in the 24 hour plate, particularly in the transverse and descending colon. The 48 hour plate shows a degree of colonic stasis, the cecum not having entirely emptied itself. At 72 hours the bismuth was nearly all in the rectum. There are no evidences of bands or adhesions.

We probably have here to deal with a spastic colon with stasis. Sodium iodide, an occasional calomel purge and oleum petrolatum have much improved this patient's symptoms.

Case III. Miss N. A. Age 25. Her father died suddenly in an attack of angina pectoris. In June, 1909, she had an attack of neuritis in left shoulder and arm, accompanied by tachycardia, faintness and dizziness. This was followed by several less severe attacks. She has had considerable digestive disturbance with constipation, frequent nausea and vomiting.

Examination: Very tall, weighing 140 lbs. She has a rather frightened expression, exceedingly nervous, with marked vaso-motor flushing over chest and neck. There is a diffuse precordial pulsation. Heart is slightly enlarged, the first sound loud and booming at the apex. Pulse is rapid. No eye symptoms of hyperthyroidism, no tremor, no struma. Abdomen showed general enteroptosis. Blood, urine and feces negative.

Early in 1914 she entered St. Luke's Hospital where she was put through a regime of rest and forced feeding. She left in two months without material benefit. During her stay she had several severe attacks of indigestion, due undoubtedly to our attempts at forced feeding.

X-ray plates at this time showed marked general ptosis with cecal stasis lasting beyond 72 hours. She was fitted with an abdominal corset, and petroleum oil and oil enemas ordered.

In January, 1915, her symptoms not having improved, another series of plates were made. The stomach is here shown tremendously ptosed with the pylorus on a level with the iliac crests in the median line. In six hours the stomach is empty and the meal largely in the cecum which is correspondingly ptosed and dilated and lying deeply in the pelvis on the left side. In 24 hours the cecum has largely emptied itself and the contents have reached the rectum which is seen in an atonic condition. The significant features here are the marked visceroptosis, the atonic condition of the stomach, cecum, and rectum, and the spasticity of the colon. It will be noted that there is no evidence of adhesive bands.

This case illustrates the futility of attempting to remedy a marked visceroptosis by means of abdominal support.

There has been considerable improvement of the general condition by the use of atropine.

Case IV. Miss D. H. Aged, 39. Presents herself with marked stigmata of mental disturbance. She was the sole attendant upon her mother who recently died of a lingering illness. For some time she has been sleepless, and is decidedly melancholic, is obsessed with the idea that she is in some way responsible for her mother's death, although she was in fact a most devoted nurse. Her digestion is good, appetite fair, bowels somewhat sluggish, though not markedly constipated. In the last month she has lost about 10 lbs. in weight.

Her abdomen is rather prominent with a resistance on palpation along the course of the cecum and ascending colon.

X-ray plates show the stomach slightly ptosed, emptying on time. There is some ileal stasis. The cecum is seen low down in the pelvis though free. A spastic condition of the second portion of the transverse colon is well seen here. That this is a spastic colon rather than due to an adhesive band is I think evidenced by the fact that there is no distention of the proximal portion of the transverse colon, as probably would be if constriction of any duration had existed, and further that the position of the transverse colon is not relatively distorted. There is of course a general ptosis. Cecal stasis exists beyond 48 hours.

Several months of institutional treatment was required to restore this patient.

At present she seems entirely well. Her mental condition has completely cleared.

Case V. Mrs. P. M. D. Age 35. Had a laparotomy 5 years ago, since which time she has had intermittent pain in the right lumbar region and on pressure over the eleventh and twelfth right intercostal nerve roots. She has obstinate constipation.

Examination shows considerable tenderness over the cecum and ascending colon. X-ray plates and screen examination showed the stomach somewhat low and atonic, empty in six hours, and the bismuth well into the cecum and ascending colon. In the 24 hour plate a kink is seen in the transverse colon which is also seen in the 48 hour plate and a subsequent one taken after a bismuth enema. This kink was thought to be a peritoneal band probably a result of the laparotomy 5 years ago. Surgical treatment was advised. Last October she had a mild attack of appendicitis which subsided by rest in bed and starvation. About three months later this patient complained of pain low in the right lower quadrant and a mass was felt there which on pelvic examination seemed to be a large tube. It was very tender.

Operation by Dr. Barbat. There were numerous adhesions of the ileum to the anterior abdominal wall. The transverse colon was bound to the left cornua of the uterus by dense inflammatory adhesions. These were so firm that it was necessary to sever them with the knife. They were probably due to raw surfaces left at the time of the removal of the left tube at the previous operation. A large unilocular cyst was resected from the right ovary. The appendix was dissected loose from a mass of adhesions and removed.

This case is interesting as illustrating a condition in which the X-ray gave positive evidence of the cause and location of the obstruction and indicated the necessity of surgical treatment. Improvement in her condition was almost immediate. Petroleum oil was used for a time. When last seen, April 29th, she had discontinued the oil, her constipation had disappeared and she felt perfectly well.

Case VI. Mrs. M. L. Aged, 56. Lives in Los Angeles. Has suffered with digestive disturbances for many years. Appendectomy and nephropexy were done about 15 years ago. She complains of gas, nausea, burning sensation in stomach, headache and backache. Her attacks come on intermittently, during the intervals she is comparatively free. For the last year she has complained of considerable pain in the region of the liver. Formerly weighing 142 lbs. she is now down to 97 lbs.

She is rather emaciated in appearance with a sallow skin and a suspicion of cachexia. Her abdomen is symmetrical with the flaccid abdominal walls of visceroptosis. Her liver is low and the right kidney is ptosed. There is tenderness on pressure over the right side of abdomen. She has taken cathartics regularly for years.

Screen examination shows a vertically ptosed stomach, emptying rapidly with cap well outlined. Plate shows the stomach below iliac crests. In six hours stomach is empty and bismuth is well in the cecum which lies on the pelvic floor, somewhat to the left. The 24 hour plate reveals the ptosis of the colon. The hepatic flexure is low and the bismuth has not advanced beyond the middle of the transverse colon where it is apparently obstructed by a kink which is well shown in the following two plates. In 48 hours some bismuth has reached the rectum, but there is still much stasis in cecum, ascending and transverse colon, which persists even after 72 hours. The kink in the transverse colon is probably caused by a dense peritoneal band as was demonstrated to be the case in the preceeding one.

Surgical relief was advised, but as yet has not been done. The futility of palliative or medicinal measures is here obvious; likewise the uselessness of corsets or other abdominal supports.

Case VII. Mrs. H. W. S. Aged, 51. She was referred to me because of a symptomatology suggestive of myocardial weakness. She has frequent attacks of

bronchitis with a hard, distressing cough, accompanied by some cyanosis and dyspnea. She is quite obese, and has had digestive distress and constipation for years.

Her heart was considerably enlarged, the left border was 12 cm. from the median line. The sounds were imperfect and a faint, systolic, basal murmur was heard. Pulse 88, systolic blood pressure 140. There was some congestion at the bases of both lungs.

Rest, diet, digitalis and strychnine improved her general condition considerably. She was lost sight of for seven months, when she returned complaining that during the past six weeks of having had periodical attacks of pain, suggestive of gall stones. She entered my service at St. Luke's Hospital for further observation.

Screen examination showed the stomach displaced and held to the right, without defects in outline. This was well shown on the plates. Several indistinct shadows are seen in the region of the gall-bladder, one very definite calcified one. These shadows are constantly seen in the entire series of plates. There was stasis in the ascending colon beyond 48 hours.

Diagnosis: Gall stones; perigastric adhesions; stasis in the ascending colon, possibly the result of the participation in the adhesions of the colon in the region of the hepatic flexure. Operation was advised.

REFERENCES.

[1] Murphy and Brooks: *Archives Internal Medicine;* 1915, XV, 392.

[2] Adami, J. G.: *British Medical Journal,* Jan. 24, 1914, 177.

[3] Eastman, J. R.: *Journal of the American Medical Association,* 1914, LXIII, 441.

[4] Lane, W. A.: Operative Treatment of Chronic Intestinal Stasis, page 83. London, Jas. Nisbet & Co., 1915.

[5] Bassler, A.: *Medical Record,* New York, 1914, LXXXV, 427.

DISCUSSION ON THE PAPERS OF DOCTORS MORRIS AND EVANS.

Dr. Howard Ruggles (by invitation) said the more thorough the examinations and the more plates taken, the more accurate the diagnosis would be.

Tone in the intestinal tract is most important. When the contents of the intestines move along at a good rate, the patient has no trouble, when tone is lacking then trouble begins. We must distinguish between organic and functional disturbances.

Dr. E. P. Fick, Seattle (by invitation) said he was pleased to learn that the importance of tone, in the diagnosis and treatment of gastro-intestinal conditions, has at last been considered, especially tone in the intestinal canal. When the X-ray first appeared we found apparently healthy people suffering from a condition of ptosis of the colon and the stomach. This was taken to mean that such individuals were in need of treatment; and it was not until some time after Cannon's work on the "Mechanics of Digestion" appeared that physicians began to consider the tone of the gastro-intestinal tract instead of the location of the abdominal contents. We have at last been taught that it does not make much difference where the colon is, but what it is doing from a peristaltic standpoint.

Dr. M. L. Graves, Galveston, Texas (by invitation) said that all of us have patients of this type, and send them to all sorts of specialists, only to have them return, worse than ever. A large number of these patients are women, who have a moderate secondary anæmia with low positions of the stomach and bowel, such as we have regarded heretofore as visceroptosis and evidences of periodic stagnation. Most of them are neurasthenic, and many of them represent what Dr. Oliver Wendell Holmes called "the maids of all work." They need a change of environ-

ment, rest and food adapted to their conditions, and many of these will get well upon that kind of a regimen, who resist all operative or medical means. The psychic element is a most important factor and must be carefully considered.

Dr. Graves asked Dr. Morris to describe just what alteration his operation makes in the position of the colon and what it does toward correcting neurasthenic symptoms?

Dr. Mattison said that when we get patients with these conditions we aim to increase the motility of the intestinal tract. Massage is necessary, but just how to give it is the question? How to increase motility, by massage or feeding or posture, is all important in attaining results.

Dr. Barnes, answering Dr. Mattison, said that a series of muscular movements, practiced in bed for five or ten minutes every morning, will help these patients regain some of the lost tone. With the subject in dorsal decubitus: First, the arms are placed at right angles with the body, the forearms flexed and the shoulders are lifted from the mattress on the elbows. The pelvis is then lifted on the shoulders and feet. When the muscles of the back and neck have grown sufficiently strong this movement may be continued to include the whole body as in opisthotonos. These movements will develop the muscles of the back that are needed to hold the bony frame in an erect posture.

Second, the abdomen is relaxed and extended and then forcibly drawn in by the action of the abdominal muscles and the diaphragm. When this movement is understood and practiced properly the subject is able to shake and agitate the entire abdominal contents.

Third, the right thigh is flexed upon the abdomen, the forearms folded about the leg and the knee drawn forcibly upon the chest. The left thigh and then both thighs, are operated in a similar manner.

Fourth, the subject, with the arms extended, assumes a sitting posture by the action of the abdominal recti and continuing the movement brings the fingers in contact with the feet. The body is then carried back to the original position. This movement should be carried out slowly in order to obtain the maximum muscular effort.

Fifth, if the subject be a woman, the hips are elevated as high as possible and the corset applied before getting out of bed.

Dr. W. Wayne Babcock said that these papers brought to mind the fact that we must consider the patient as a whole. Delayed motility may have as an underlying cause nerve disorders, tuberculosis, etc. We must go back, getting away from the local, mechanical conditions and see what the cause is. The X-ray has done much harm as well as good. Harm, due to improper use, and to improper interpretation of the picture placed before us.

Most of these cases he had found were relieved, best of all, by good, general care.

Dr. Evans repeated what he had said in his paper, that this line of treatment can only be carried out in institutions and where people are properly trained in the handling of this class of patients.

Dr. Morris, in closing, said that the practical results of his operations have been so good that he might speak with enthusiasm were it not that his past experience has lead him to be cautious in making any definite statements. Short circuiting the colon should be left to cases which do not respond to good medical treatment.

VISCERAL STASIS, MECHANICAL OBSTRUCTIONS, AND THEIR EFFECTS, RELIEVABLE BY RATIONAL MEASURES.*

A Preliminary Report.

BY J. MADISON TAYLOR, A.B., M.D.,

Assistant Professor of Non-pharmaceutic Therapeutics, Medical Department, Temple University.

PHILADELPHIA, PA.

Few problems are of greater significance than determining how to relieve effects of visceral stasis, adhesions, kinks, or other mechanical obstructions in vegetative mechanisms, and to apply efficient remedial measures. Surgical interference by operation is coming to be less and less confidently employed.

An important clinical correlation exists between the ptoses, splanchnic circulation, their innervation (especially the autonomic), and visceral or intestinal obstruction, local spasms or atonies, and also some metabolic disorders, neurasthenia, psychasthenia, general wretchedness, and inefficiency.

Through the invaluable contributions of abdominal surgeons and roentgenologists, many obscure and otherwise inexplicable problems in general medicine have been illuminated. A certain proportion of these problems can be solved only by resort to the knife, others are admittedly unsuitable for operative interference.

Some subjective phenomena are sufficiently distressing, yet of such varied causation and manifestation, as to render the victims incapable of maintaining their place in the scheme of current life. In whomsoever they exist, remedies should be provived, as radical, yet as simple and safe as possible.

About fifteen years ago, I began experimenting by manipulation in some cases presenting visceral obstructions and disturbances of tone. These I was able to relieve remarkably by combining stimulus to the vasomotor subcentres, along with pressure on the abdomen in the lower quadrants, including the area most affected. Gradually empirical

*Read by title.

movements guided by physiological hints supplied the basis for a diagnostic and therapeutic system which has served me in working out present methods.

Education of the sustaining musculature is a valuable adjunct. As observations and experience multiplied, my confidence grew. Little of encouragement came from reading or from critical colleagues. Analogous reported instances were few. Information during my earlier attempts was not precise. Later, surgeons and roentgenologists began to accumulate invaluable data, such as are crystallized in the delightful little book, *Pathology of the Living,* by Sir Berkeley Moynihan.

My earlier crude attempts were occasionally successful beyond expectation,[1] and many of the cases are still under observation.

Recently I learned of the work of Doctor Bourcart, of Geneva, a surgeon who is said to have abandoned the knife for manipulation, and has had singular successes on persons who either refused operation or whose conditions were inoperable. Being unable to get first hand evidence, I combined what could be learned of his methods with my own, and am now encouraged to believe there is much of promise for these sufferers. Doctor Bourcart is said to lift and pull on the tissues. This, in my hands, causes characteristic pains of a dull, sickening sort, especially when made over the areas shown by x-rays to be adherent or angulated Hence a diagnostic as well as a therapeutic method is being evolved.

Up to date the objective and subjective symptoms I have formulated may be sketched as follows:

Objective—A pull on well relaxed abdominal walls seems capable of affecting the structures below to a degree at first surprising, which also becomes more pronounced as treatment progresses. Guided by Henry Flack Graham's diagram, along with particular reference to the peculiarities or abnormalities found, there appear to be limitations in accord with normally existing membranes, veils, or adhesions suspected, which yield as tractions are repeated.

Subjective—In an abdomen presumably free from abnormalities, adhesions, kinks, etc., there is no more than a moderate amount of discomfort, varying in degree, though little in kind, due to hypersensitiveness to skin pinch or sense of drag. Where these abnormalities exist, the sensory reaction to pulling exhibits certain commonly recurring subjective sensations, too numerous to describe, varying also in degrees of activity or chronicity of causal process, requiring much experience and

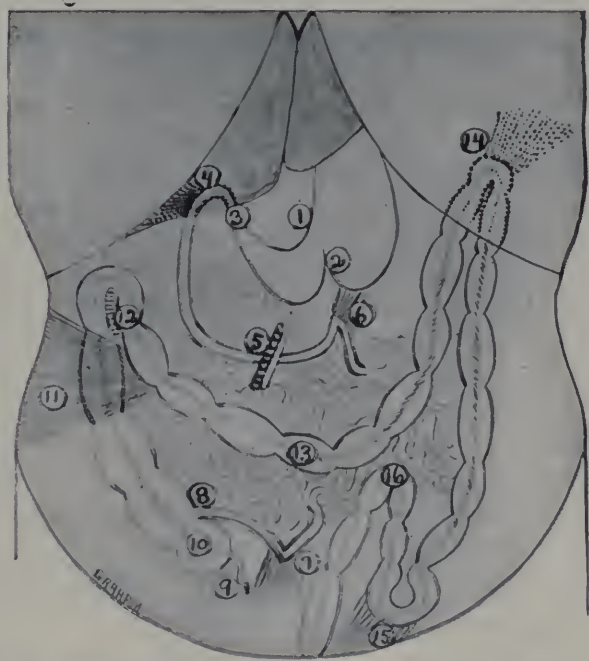
---

[1] Notably one of a lady, fifteen years ago, in whom the gall-bladder was apparently obstructed by adhesive bands, who had had the advantage of many distinguished specialists, but without relief; also a number of postoperative cases, obviously suffering from adhesions, from fifteen to ten years ago.

revision to codify. As a rule, the existence of subacute or chronic appendicitis is shown by a peculiarly severe tenderness on dragging toward the umbilicus.

Any adhesion yields a dull "sickening" pain, the more acute ones a nausea for a few moments, usually subsiding soon after cessation of traction. Postoperative adhesions yield somewhat similar sensations, usually less severe than those wherein an acute process has existed without operative interference; variations, of course, are wide.

In women who have suffered any kind or degree of acute disorder in or about the uterus or annexa, traction on the umbilicus is painful; so also if the bladder has been affected, pain of a characteristic kind occurs on traction; old ovarian or tubal lesions induce peculiar hypersensitive-



Diagram, showing causes of gastrointestinal stasis. 1. Prolapsed stomach. 2. Hourglass stomach. 3. Pyloric obstruction. 4. Adhesions at the duodenum. 5. Mesenteric ileus. 6. Adhesions at duodenojejunal angle. 7. Lane's kink. 8. Incompetent ileocecal valve. 9. Chronic appendicitis. 10. Mobile and dilated cecum. 11. Jackson's membrane. 12. Adhesions at the hepatic flexure of the colon. 13. Prolapsed colon. 14. Adhesions at the splenic flexure of the colon. 15. Adhesions at the sigmoid. 16. Angulation at the recto-sigmoid junction. [Reprinted from the article on Gastro-intestinal Stasis by Dr. Henry Flack Graham, *N. Y. Med Journal,* May 16, 1914.]

nesses. Any upward traction on the umbilical areas is more uncomfortable than other forms of pull, even in normal persons.

These random memoranda will serve to show that the phenomena

are capable of being reduced to a workable symptomatology.

The factors of treatment so far as elaborated, now consist of:

1. Mechanical pressure and traction upon the paravertebral structure.[2]

2. Gentle, very slow pressures on abdominal contents from a point near the anterior superior spines of the ilium, radiating in a quarter circle for six or eight inches in each side in turn toward the diaphragm. This relaxes spasm, seems also to induce action of peristalsis when in abeyance, an equalization of neuromuscular action, in short, a balance.

3. A two-hand compression of the abdominal contents, lateral and upward. This stimulates a general peristaltic and interorganic movement and mechanically adjusts fluid contents and hydraulic competence, and hastens emptying.

4. A lifting, a slow and graduated pull on the abdominal walls, which procedure exacts some effort to achieve expertness; much help is afforded as to direction, by the diagram of Henry Flack Graham.

5. Eliciting the cooperation of the patient voluntarily to compress and elevate the abdominal walls till the contents are increasingly forced upward; this enhances muscular power of raising the viscera and holding them in place.

6. Also lifting the head while in dorsal decubitus, and performing a cross thrust of the arms to right, then to left (R. Tait McKenzie's method of elicting the action of, and developing the transversalis muscles in cure of hernia).

The whole procedure occupies about ten minutes and is repeated every third day.[3]

---

[2] See former paper by the author, Remarks on the Treatment of Chronic Diseases, *Monthly Cyclopedia,* Feb., 1912, etc.

[3] The author will be grateful for comments or criticisms on this subject from those qualified by experience to make them, especially abdominal surgeons, röntgenologists, and gastroenterologists.

THE THERAPEUTICS OF ANGINA PECTORIS.*

BY ROBERT H. BABCOCK, M.D., L.L.D.,

CHICAGO, ILLINOIS.

Since the term angina pectoris designates a symptom and not a uniform pathological entity, rational treatment should include both temporary relief from suffering, and, so far as possible, correction or improvement of the underlying condition. Accordingly the first step in the undertaking must be the correct diagnosis of the pathological state responsible for the pain. It would be going afield to discuss the question whether or not there is a false and a true angina. Strictly speaking, angina pectoris is a chest pain associated with certain characteristics which give it features distinctive from intercostal neuralgia or pleurodynia, but we all know there is one kind of angina associated with and depending on organic disease of the heart, and another which in so far as physical examination can determine is independent of cardiac disease. The management of the two is different, just as the prognosis is different. In this paper, therefore, an attempt will be made to set forth what seems to me to be the mode of treatment suitable to the grave form of angina which carries with it the liability to sudden death.

Ever since Lauder Brunton called attention to the remarkable effect of the nitrites in allaying the distress of this formidable malady, English and American physicians have prescribed nitroglycerin or amyl nitrite well nigh universally and with good reason, since in practically all cases the remedy promptly affords relief. Its precise *modus operandi* is open to discussion, but its effectiveness is too well established to be doubted or distrusted simply because we can not explain its exact mode of action. That a nitrite does not act equally well or promptly in all cases is likewise true. Doubtless those cases are most quickly and completely relieved in which vascular spasm seems present, as shown by pallor of countenance and coldness of the extremities.

On the other hand it is not good practice to prescribe a nitrite every two or three hours with a view to preventing or lessening the frequency and severity of attacks. Some German writers, notably von Leyden, have considered the use of the nitrites detrimental, and their objection would hold especially with regard to the regular daily employ-

*Read by title.

ment of this valuable class of remedies. This was impressed upon me this past winter. A man of sixty-seven had been treated in another city for frequently recurring and intense attacks of grave angina. Nitroglycerin and amyl nitrite usually afforded relief, but I was quite horrified to learn that he was taking two and three-fiftieths of nitroglycerin three times daily, besides inhaling the amyl nitrite whenever he experienced even a premonition of pain. His heart showed signs of dilatation and his blood-pressure registered 120 mm. systolic, and 100 mm. diastolic, giving a pulse pressure of only 20 mm., or less than one-fifth of the minimum pressure.

There seemed to be good reason why this man was having angina several times a day and often without discoverable provocation. This use of nitroglycerin was stopped and he was put upon strophanthin half a milligram four times daily, while instead of inhaling nitrite or amyl so frequently he was given a hpodermic of morphine and atropine when pain was really intense or when ammonia or whisky failed to relieve. At first he also received half a drachm of aromatic spirit of ammonia every two hours. Although the angina continued to distress the man more or less, still his condition became less intolerable. In this case there were complications which favored the continuance and even the occurrence of his attacks, as I believe is true in many instances.

The foregoing case was probably one of coronary angina, since aside from increased size and feebleness of tones the examination disclosed nothing on the part of the heart. The prognosis, therefore, was exceedingly unfavorable, and sudden death is probable despite any form of treatment.

The nitrites cause vascular relaxation with secondary acceleration and force of heart action. It is for this reason that they are useful in cases of coronary angina, since they occasion a better flushing of the coronaries. It should be remembered, however, that their effect is not confined to the nutrient arteries of the heart, but that they dilate the vessels in general, including those within the abdomen. Consequently if a nitrite preparation be taken habitually and frequently it lowers vascular tone and really augments the heart's work.

As is well known all cases of grave angina are not due to coronary sclerosis; nor are they associated with arterial hypertension. Even when blood-pressure is abnormally high it is not well to prescribe these vascular dilators at short intervals with a view to lowering pressure. They not only fail in preventing anginal seizures but they weaken the heart and thus actually frustrate the object to be achieved. Every consideration, therefore, makes it evident, as I take it, that the use of the nitrites should be limited to the relief of the anginal attack itself, and even then some caution should be observed. Fortunately the seizure is usually of rather brief duration and yields to the inhalation of a single

three-minim pearl of amyl nitrite or to one or two tablets of a hundredth grain of nitroglycerin dissolved on the tongue. But should the attack prove unusually intractible or should a status anginosus occur, then morphine and atropine hypodermatically should be employed and freely if necessary. Should this not relieve, other stimulants, such as camphor, ammonia, caffein, and even digitalis, should be resorted to. I well recall one instance seen in consultation in which angina persisted despite all measures, until the fatal termination. In this instance I believe death was hastened, if not rendered inevitable, by the too free use of nitroglycerin and atropine, since they were administered hourly, as I learned subsequently, and must have paralyzed the capillaries, thus bringing the heart to a standstill.

Although this paper is intended as a protest against the indiscriminate employment of vaso-dilators, it can not be concluded without a brief consideration of the management of this class of cases between attacks. Manifestly the aim of treatment should be to strengthen the myorcardium so as to enable the individual to exercise or bear psychical disturbances without the induction thereby of angina. This is possible of achievement in only a limited proportion of cases, and perhaps not at all when coronary sclerosis is responsible for the symptoms. Nevertheless, an attempt should be made to this end and accordingly we have three chief means at our disposal; namely, drugs, medical gymnastics, and hydrotherapy.

In some cases theobromine sodium salicylate in doses of five to ten grains three time a day, has apparently been of benefit. Yet truth compels the statement that the use of this drug has always been conjoined with strict regulation of diet and habits and sometimes with the use of medical gymnastics. But one man of seventy was emphatic in his declaration that this medicine did him more good than anything else. Indeed, it is well nigh a routine practice with me to give this remedy a trial before resorting to other cardiac stimulants.

The efficacy of this agent depends probably on the theobromine and not the sodium salicylate which is added to increase the solubility of the alkaloid. The exact *modus operandi* may not be clearly known, but theobromine probably acts in the same manner as does caffeine; that is, it stimulates the heart and perhaps exerts some dilating influence on the coronary arteries. I have never been able to recognize any definite or certain effect on general blood-pressure. I usually prescribe it in capsules and in combination with an amylolytic vegetable ferment or pancreatin, and rarely find it disturbs the stomach.

Digitalis, and in particular amorphous strophanthin in half mg. doses three to four times daily, have likewise proven useful in certain cases. As might be expected these are not individuals whose angina seems to

depend on obstructive coronary disease, but persons with signs of general cardiovascular changes, stiffened vessels, blood-pressure more or less elevated and hypertrophic dilatation of the heart, and generally a mitral systolic murmur together with a rough systolic bruit in the aortic area. In such cases the angina may not be so much an expression of inadequate coronary flushing as of intra-cardiac pressure or strain. At all events more than one sufferer of this type has found amelioration of his symptoms from the combination of drugs and exercises herein advocated. Indeed, there is now under observation a man of sixty-four whose condition has improved so greatly that he now is able to walk at his ordinary gait and even against a wind, without pain, whereas on coming under treatment he was resorting to nitroglycerin several times a day.

A valuable adjuvant to drugs in the management of this class of cardiopaths are medical gymnastics. By these are meant active exercises under the supervision and control of some one skilled in their use. Massage may be of limited service, but the exercises here meant are those of deep breathing and movements of extension and rotation of the trunk and extremities, all carefully controlled so as not to accelerate the pulse materially or embarrass respiration. Their object is to hasten venous flow, especially in the large vessels of the abdomen, to dilate the intramuscular arterioles and thus to aid the enfeebled myocardium in maintaining circulation. Most sufferers from angina feel the need of exercise and not being able to walk, miss the sense of well-being that comes from physical exercise. It is gratifying and often surprising how much better they feel during a course of medical gymnastics, and how much really vigorous movements they learn to execute without experiencing pain or dyspnœa. Indeed, so much faith have I in the efficacy of these exercises that they form an essential part of the regime prescribed by me for those myocardial patients who can afford the expense. On the other hand it will not do to allow individuals with angina pectoris or other evidences of myocardial incompetence, to carry out self-resisting exercises, since they are very likely to embarass rather than improve their heart's action.

Hydrotherapy is likewise of benefit if properly employed. I refer to salt rubs and Nauheim baths. The only caution observed in the giving of salt rubs is that the water used in showering the patent after the rub be not too cold, care being taken that a good glow of the skin is produced. Patients quite universally admit a sense of comfort and well-being after their rub.

Nauheim baths by means of artificially prepared waters have also been prescribed for a goodly number of persons suffering from the formidable malady now under consideration. They have to be ordered with extreme care since in my experience these patients do not bear very strong baths or a high percentage of carbonic acid. I now recall

only one patient who appeared not to be benefited by the baths, and he after a few had been given seemed to be so unfavorably affected that this mode of therapy had to be discontinued.

Finally, of course much attention should be paid to the dietary and to the state of the bowels. As is well known these patients are very apt to regard their pain as a manifestation of indigestion, especially since their distress is apt to pass off coincidently with eructations of gas. Nevertheless it is important to see that digestion is well performed since distention of the stomach or bowels with gas is likely to aggravate their symptoms. It may be necessary, therefore, to change their diet and to order certain aids to digestion—such as dilute hydrochloric acid and occasional cathartics. In short, the intelligent management of sufferers from this distressing malady must include not alone relief of pain, but such other measures as may strengthen the heart and thereby possibly diminish the frequency and intensity of their suffering. Little if anything can be done probably to correct the coronary sclerosis unless perchance when syphilis is the cause, and then I must confess to very slight faith in iodin preparations, although I often prescribe them.

The percentage of cases that can be helped is at the most small, but those offering some prospect of permanent benefit from treatment appear to be such as present the following physical signs:—moderate stiffness of the peripheral vessels, with or without abnormally high blood-pressure, hypertrophic dilatation of the heart, a mitral systolic murmur of muscular incompetence, and often a harsh systolic bruit in the aortic area. As pointed out by the late John Musser their angina diminishes or disappears as intra-cardiac pressures becomes diminished. This may occur with the re-establishment of compensatory hypertrophy in cases in which a mitral leak developed as a result of dilatation, or in some few instances the giving way of the mitral valve appears to relieve the stretched left ventricle of strain and so lessen the liability to anginal pain. At all events such seems to have been my observation.

If, as held by some clinicians, angina pectoris be a symptom of inadequate flushing of the coronary arteries, then the re-established hypertrophy enables the ventricles to throw a greater volume of blood into their nutrient arteries. When on the contrary the angina is due to obstructive disease of these vessels no amount of treatment is going to abolish symptoms, and death is only a matter of time. Avoidance of causes that evoke pain, and the employment of nitrites or morphine is then our only recourse.

THE TREATMENT OF CARDIAC SYPHILIS.*

BY JAMES M. ANDERS, M.D., LL.D.

PHILADELPHIA, PA.

Prophylaxis. The fact has long been recognized that a more systematic treatment of syphilis would lessen the incidence of cardiovascular affections. The spirochætes display a selective action for the myocardium, and once imbedded in the structure of the heart they are confessedly difficult to eradicate. Longcope[1] affirms that for some reason, as yet unexplained, the root of the aorta and ascending arch seem to be one of the sites of predilection for the organism. The cardiac lesions caused by the spirochaeta pallida in the main belong to, but do not develop solely in, the tertian stage of syphilis.

Longcope, from his extensive studies of syphilitic aortitis, concludes that infection of the aorta probably occurs during the secondary stage, "and though the symptoms and signs of syphilitic aortitis with the complications may develop within a few months of infection, the process usually remains latent or unrecognized for an average of sixteen or seventeen years."

Grassman, and, later, Brooks and others, have expressed the opinion that lesions of a serious character may appear as early as the fore part of the second stage.

Isaac Adler[2] first pointed out that the most important lesion of the heart in all stages of syphilis is one of the myocardium which is dependent on periarteritis of the coronary vessels. The frequent occurrence of this finding, has been confirmed by Harlow Brooks[3] and later by Warthin,[4] who has demonstrated the presence of spirochætes in these characteristic foci, and Wright[5] was able to demonstrate these organisms often in enormous numbers in all of five cases of mesaortitis.

Says Richard Cabot:[6] "The permeation of the congenital syphilitic's myocardium with spirochætes (as shown by Warthin and others) makes it probable that in adults as well, many cases of myocarditis are due to syphilis." In this connection, Babcock[7] pertinently remarks: "Consequently, whenever we have charge of a patient with only the primary lesion and still more with secondary manifestation of this insidious and

*Read by title.

malign infection, we should bear in mind the likelihood of incipient visceral disturbance and be on the unceasing lookout for signs of functional derangement by which alone, perchance we may recognize and forestall more serious results."

Longcope concludes from autopsy statistics and the Wassermann reaction that 75 per cent. of cases of aortic insufficiency are dependent on syphilitic aortitis.

Now there is perfect agreement among syphilographers that, when either aortic regurgitation or syphilis of the myocardium of marked extent exists, curative treatment is impossible of attainment, as a rule, hence the obvious necessity for a vigorous and prolonged course of medication during the early stages of this disease, Wasserman tests being made at intervals until a positive reaction is no longer obtained. In this manner, and in this manner only, may we successfully kill the spirochætes before they localize themselves in the cardiac tissues. Physicians should feel themselves charged with a serious responsibility on behalf of the public in regard to the question of the wise direction of the treatment of early syphilis, and realize the greatness of that responsibility, as well as the unanswerable indictment that lies against them if they fail to discharge their plain duty toward this class of sufferers.

Perhaps, one of the principal reasons why treatment should be carried out at the earliest possible period after infection lies in the hazard and danger from the administration of dioxydiamido-arsenobenzol in cases in which severe forms of cardio-vascular syphilis develop subsequently. An investigation into this question has revealed the fact that deaths, occurring either suddenly or after several days, from the use of dioxydiamido-arsenobenzol or its sodium salt in these cases, is due, in the immense majority of the cases, to myocardial degeneration secondary to coronary lesions.

A sane view of the prophylaxis of cardiac involvement in this disease demands inclusion of the treatment of its secondary manifestations. It is in this stage that their development sometimes takes place, and also that the time of cardiac invasion can be fixed, in some cases at least. Grossman[8] studied the cardio-vascular system of 288 cases of secondary syphilis, and in 85 per cent. found disturbances of the rate and rhythm of the pulse, while in 40 per cent. accidental murmurs, usually with dilatation, occurred. Here it should be pointed out that the cardiac lesions—aortic insufficiency, myocarditis, a certain group of cases of angina pectoris, and aortic aneurysms—are looked upon by many writers as complications of syphilitic aortitis.

In my opinion, when these associated cardiac lesions arise in the acute and secondary stages of syphilis they are most successfully treated by the combined use of mercury and Erhlich's salt. The iodides should

not be employed in the treatment of these stages, but, as will be pointed out hereafter, are valuable adjuvants quite late in the disease, or after the active syphilitic process has been checked. The most successful method is by the vigorous administration intramuscularly of mercuric salicylate pushed to the limit of tolerance to be then followed by the arsenical salt (also given intramuscularly). After the lapse of a few days the mercury must be resumed, and respecting cases that do not manifest the most active symptoms, I am in agreement with Brooks and Carroll[9] in stating that the protiodide administered per os may at times prove entirely satisfactory in its effects.

The writer believes that the combined method briefly outlined above, especially in acute stages, is capable of yielding more brilliant results than the use of either Erhlich's salt or mercury alone. I am quite aware that many clinicians contend for vigorous treatment with mercury only, believing that the results thus obtained are comparable to those in which both remedies are employed. In these early cases, attention to the circulatory disturbances may be additionally demanded. The Wassermann test should invariably be made, and the only criterion of sufficiency of specific treatment, is a negative Wassermann reaction. Moreover, the employment of this test from time to time enables one to determine what success has attended our efforts at eradication of this subtle and obstinate malady" (Babcock).

Furthermore, it should be the rule among clinicians not to place absolute reliance upon a single negative Wassermann reaction, but to repeat the test after the lapse of a couple of months, mercury in some form being exhibited in the meanwhile. At all events, if this procedure cannot be carried out subsequently, then mercury should be exhibited for a year, in order to make thrice certain that a cure has been effected. The failure to obtain a positive result in these cases may have been due either to faulty technique, or to the fact that too few spirochætes were present to cause the production of anti-bodies. I have observed this to be true of cases apparently cured with the use of dioxydiamido-arsenobenzol.

On the other hand, early cases of lues are not invariably curable. Again, cases treated with mercury without complete success, owing possibly to the establishment of tolerance toward the remedy, may yield to one or more doses of the same salt. As illustrative of cases of this sort, the writer has notes of an instance occurring in a male aged 35 years, in whom mercury had been employed for a period of four years from the first appearance of secondary manifestations, and it was not until after two doses of the arsenical salt had been given intramuscularly that a negative Wassermann reaction was repeatedly obtained. My experience coincides with that of Brooks and Carroll,[10] who have found that when treatment by mercury is resumed after a discontinuance for

a variable interval of time, a prompt response to it is less likely to occur than in cases in which it was administered without any interruptions.

Treatment of Cardiac Cases in the Tertiary Stage:—The majority of the cases of cardiac syphilis which the writer has treated either in hospital or private practice, have been late cases, typical instances for the most part of aortic regurgitation in decompensation and equally typical ones of myocardial degeneration independently of aortic incompetency. In the management of these cases, in many of which dropsy has supervened, the usual circulatory indications are to be met, as under other circumstances. For example, complete rest of body, hygienic and therapeutic measures, e. g. digitalis, are all to be enjoined, with modifications to suit individual cases. It cannot, however, be denied that these agencies fail to afford as satisfactory results as in non-syphilitic cases of cardiac disease.

Assuming the Wassermann reaction to be present, how shall the syphilitic element be attacked in these late cases? Shall Ehrlich's arsenical preparation be employed in aortic incompetence after decompensation has appeared? There are two small classes of cases in which the use of this salt is, to my mind quite justifiable. 1. In myocarditis and aortic insufficiency in which the actual condition of the myorcadium is indeterminable but obviously not degenerated to a marked extent; and 2. Those cases occurring in patients who urgently demand that something be done to afford them relief from their sufferings. Stone[11] has invited attention to two cases belonging to the latter class in which the distressing symptoms were minimized by the use of Ehrlich's salt.

In well marked cases of syphilitic myocarditis and in aortic incompetency due to the same cause, it is my custom to give mercury, by inunction, and this failing, by the hypodermatic method, a prolonged trial. If this does not yield a favorable result, i. e., a negative Wassermann reaction, then the arsenical salt is used intramuscularly, at first in small doses. In this group of cases the injections are to be followed by a period of absolute physical rest. Ehrlich, quoted by Held[12] emphasizes this point, stating that it is an important factor in the treatment, with dioxydiamido-arsenobenzol, of cardio-vascular conditions dependent on syphilis. All such cases should be treated in a hospital and Held properly recommends that the patient be kept at rest for from 24 to 36 hours, and in instances of myocardial degeneration, not less than two weeks together with the use of other measures entering into the routine treatment of that condition.

I agree with Daland that the intravenous method of administration of this agent is too hazardous to life to permit of its adoption in these cases, and especially is this true in cases in which decided and rapid invasion of the myocardium has declared itself symptomatically, e. g. in arrhythmia, tachycardia, and the development of fresh murmurs. It should be pointed out that experience has shown the new Ehrlich's salt to be no less apt to

induce serious collapse than the old, and the former is not any less painful than the latter, in my experience. Brooks and Carroll are of the opinion that "the old salt of Ehrlich is more efficacious in the relief of heart complications in syphilis than the new."

Unless a negative Wassermann reaction occurs where the arsenical salt is administered in the manner stated above, a follow-up course of mercury should be accorded a fair trial, and it may now give a permanent result. To show the degree of improvement gained from any method of treatment, the Wassermann test should be, as already stated, made from time to time.

The iodides are indicated in the treatment of cardiac syphilis after the active process has been checked or has ceased, in order to effect absorption and replacement of tissue, and it is advisable to continue them so long as progressive improvement is manifested. For a period of one year after a negative Wassermann reaction has been obtained, mercury should also be exhibited in these long standing cases, and this combined medication should not be neglected. The dose of the iodides, preferably of potassium, may be pushed to the limit of tolerance, if desired, but I have not seen any better results from this mode of administration than from a maximum dose of 10 or 15 grains gradually reached after commencing with 5 grains.

As the result of my limited experience, I have become thoroughly convinced that the majority of late cases of cardiac syphilis do not carry a favorable prognosis as to cure, but some degree of amelioration of the symptoms, and prolongation of life in comparative comfort may be confidently expected in the majority of cases.

BIBLIOGRAPHY.

[1] *Archives of Internal Medicine,* 1913, XI, 15.
[2] *Transactions of the Association of American Physicians,* May 3, 1898.
[3] *Medical Record,* New York, 1912, LXXXI, 351.
[4] *Transactions of the Association of American Physicians,* May 13, 1914.
[5] *Boston Medical and Surgical Journal,* 1909, CLX, 539.
[6] *Journal American Medical Association,* Oct. 24, 1914.
[7] *Trans. of the American Climatological Association,* 1912, XXVIII, 244.
[8] *Deutsch Arch. f. Klin. Med.,* 1900, LXVIII, 455; 1901, LXIX, 58 and 264.
[9-10] *Journal American Medical Association,* Oct. 24, 1914, 1456.
[11] *Trans. of the American Climatological Association,* 1912, XXVIII, 259.
[12] *Medical Record,* New York, 1913, LXXXIV, 1105.

SOME ABNORMAL CARDIAC CONDUCTIVITIES.*

BY THOMAS E. SATTERTHWAITE, M.D., Sc.D., LL.D.,

NEW YORK.

Before forming views as to the many causes of irregular heart action, the intimate structure of the heart and its physiological laws should claim our attention.

So far as cardiac physiology is concerned, a very advanced step was taken by Gaskell (Schaefer's *Text Book of Physiology,* 1900, II pp. 169 *et seq.*) when he laid down his five attributes of cardiac muscle, viz., Rhythmicity, Excitability, Contractility, Conductivity, and Tonicity. And they were soon accepted as suitable bases for classifying the arrhythmias. But while these divisions have been of great practical value, we are not to believe that each form of arrhythmia is necessarily included within the hard and fast lines of any sort of classification, which must of course have its limitations. And this is especially true in the case of arrhythmias, because we sometimes find that interference with conduction, as in heart block, will alternate with rapid contractions, caused by auricular fibrillation or flutter, a single cause producing the two anomalies. In fact, all of the five attributes are at times interconnected. To take other examples, abnormal rhythmicity may depend either on increased excitability, abnormalities of contraction or of conduction. Even tonicity is etiologically related to others of the attributes, for it represents what has been called a "balanced mechanism," the tone of the organ being maintained by the nervous force of antagonistic powers, which make it particularly sensitive to any delicate stimulus. Such opposing influences maintain a normal tone.

In anomalies of conduction either some alteration has taken place in the tissues that conduct impulses between the s-a or sino-auricular node and their ultimate termination in Purkinje's fibres; or there is functional disease or some organic change in the nerve filaments along the line of the vagus.

It is still a question at issue among physiologists whether the influence that starts the heart beat and conducts it is myogenic or neurogenic. Pflüger has shown that the human heart beats in the third week of intrauterine life, though according to His and Romberg ganglion cells are not to

*Read by title.

be found before the fifth week. Nicolai has pointed out, however, that the material which first pulsates is not muscle, but an undifferentiated substance, the "contractile protoplasm" of Kölliker. (Nicolai, *Archiv. f. Anat. u. Phys., Phys. Abtheil.,* 1910, *s.* 35 *et seq.*) On the other hand, nerve fibrils and ganglion cells have been found both in the s-a node, from which we believe the normal impulse gets its first start, and also in the a-v or auriculo-ventricular node, which at times supplants the other node in function; also in any part of the conducting tract, the last discovery being that of Engel (Engel, *Beiträge z. Path. Anat.,* 1910, *s.* 499), who traced nerve filaments as far as their connection with the Purkinje network on the inner walls of the ventricles. The fibres were found in a human heart within about an hour after death by a new method of staining of nerve tissues.

The s-a node is in the right auricle. It surrounds the upper portion of the sulcus terminalis. From this point the impulse spreads at the rate of about 1,000 millimeters per second along certain muscle tracts that radiate from the node. These radiations extend over the entire inner surface of the right auricle, terminating in its chief veins. But it also courses to the a-v or inferior node, whence it is transmitted to the left auricle and afterwards to the right ventricle through the auriculo-ventricular bundle, known as the bundle of His, or Gaskell's bridge. It continues on to join with the Purkinje fibres. Some, however, still maintain that in addition it may originate in the coronary sinus, which is the dilated remnant of the great cardiac vein, and lies in the coronary sulcus between the left auricle and left ventricle. It is the representative of the sinus venosus of fetal life, and persists in some of the lower vertebrates as such. The coronary sinus opens into the right auricle, quite near the auriculo-ventricular node, and excitations about the orifice of the sinus will elicit responses from the ventricle much as from either the s-a or the a-v nodes. Undoubtedly, I think, there are a number of points in the interior of the right auricle which will stimulate the ventricle in a similar manner. We may therefore regard this sinus as sharing with the s-a and a-v nodes the property of exciting a current that will cause ventricular contraction. This impulse having started from the right auricle causes primarily an excitation that produces contraction first in the conus, or infundibulum, close to the interventricular groove, or in the anterior papillary muscle which lies under the conus. Then follows excitation of all the remainder of the ventricle, except that part of the conus directly below the pulmonary valve. For it is this part of the conus that is the last to be excited.

In the left ventricle the first part to be excited is the apex, and about a hundredth of a second later the neighboring parts, and finally the base. The course of the impulse bears no relation to the direction of the muscle fibre.

The auricular part of the wave occupies from four to five hundredths

of a second, the ventricular less than three hundredths. (Lewis, *Lectures on the Heart,* 1915, pp. 16 *et seq.*) Probably sympathetic fibres will be found along the course of the conducting tract; some new method of preparing or staining the tissues will be found that will demonstrate them. In both the s-a and a-v nodes there have been found ganglia and nerve fibrils, some of which at least are vagal. They are embedded in an interlacing network of connective tissue and elastic fibres, intermixed with which are peculiar delicately cross-striated muscle cells.

The s-a node lies close to the roof of the right auricle, at the roofs of the superior venae cavae, while the a-v, auriculo-ventricular, or Tawara's node is placed in the junctional tissues of the auricular septum. While the normal impulse originates at the s-a node, if for any reason it is intercepted or nullified, the a-v node assumes the primary role and becomes the pace-maker of cardiac action. But if this lower node should happen to be out of commission, the ventricle will still get the impulse from some centre of its own. Probably there are several. But in such a case the ventricle will not become the pace-maker for the auricle; it will not transmit its impulse in a direction the reverse of the normal.

There are also probably accelerator and inhibitory ganglia in the nodes, for in sharks and dogfish Hemmeter has found them in the sinus venosus, which is the prototype of the coronary sinus in the human species. (Satterthwaite, *Cardiovascular Diseases,* 1912, p 19.) The accelerator nerves belong to the central nerve system, the inhibitory to the sympathetic. In fact, the accelerators unite with the upper and lower branches of the vagus, forming the cardiac plexus, which covers the ascending portion and arch of the aorta. From this source the heart receives both its accelerator and inhibitory fibres. The one hastens and the other retards the action of the heart. It is possible also that the ventricles are supplied with nerves through the network formed by the coronary system of vessels, which anastomose freely, contrary to the views of Hyrtl. The vagus itself controls the rate and force of contraction. For pressure on the vagus in the neck produces slower and slower cardiac contractions, until eventually they will come to a standstill. In fact, direct stimulation of the vagus, experimentally, may keep the heart action inhibited for several hours. Or the inhibition may be brought about indirectly, as by distention of the stomach or intestines by gas, when the action of the heart may be entirely stopped. In such cases, sometimes called asystole, we should naturally expect that respiration would be suspended as well, as it also depends on vagal influence. I have seen such a case, where death seemed actually to have taken place. The modus operandi of such a suspension of function has been explained by Howell (Howell, *Textbook of Physiology,* 1911, p. 579); on the theory that an afferent impulse is conveyed to the central nervous system, stimulating those cells in the medulla which give origin to the inhibitory fibres,

and so by reflex influence causing the standstill. The site of this cardio-inhibitory centre is unknown to us as yet.

Suspension of the heart's action may also follow very deep inspiration, due to the pressure on the filaments of the vagus by the inspiratory act. The heart is furnished with two kinds of muscles fibres, in addition to the peculiar transversely-striated fibres of the auricles and ventricles. These are the muscle fibres of the vessels and of the nodes. The latter have already been described. It is through the medium of these muscle fibres that the activities of the organ are provoked and maintained.

Of late years great progress has been made in our analysis of the structure of the heart by researches into its embryology and minute anatomy. At the same time our knowledge of its physiological qualities has been vastly increased by the use of improved graphic methods, used to record the relations in time and force of the contractions in its chambers. The polygraph is an instrument that is capable of giving tracings of the blood flow in all the four chambers of the heart, and is the best instrument available at the present time for the interpretation of cardiac anomalies. It is especially valuable for clinical work. The electrocardiograph combines the use of electricity and photography, and is essentially a laboratory machine; but it has the advantage over most polygraphic machines that it operates automatically, and registers normal and pathological conditions of auricular contractions more clearly than the polygraph. Neither of them furnishes a record that is absolutely correct in point of time. We usually judge of the time of the auricular impulse by the jugular, and in so doing the interval of time lost is normally about 1/10 second, with a further loss attributable to the mechanical operation of the instrument that is from 1/10 to 1/5 of a second. In the electrocardiogram the contraction of the ventricle is heralded by the contraction of papillary muscles, which is apt to be in normal cases 1/20 of a second in advance of the actual contraction of the ventricular walls as a whole.

In graphic tracings the strokes that represent the contractions of both auricles and ventricles are composite, being made upon the one hand of the auricular contractions which are not quite simultaneous, or of those of the ventricles, which also contract separately. Such are the conditions one has to face in the interpretation of both polygrams and electrocardiograms.

In taking up some of the phases of abnormal conductivity, brief allusion will be made to frequency and infrequency of heart action.

So far as we know, frequency of heart action must be laid to nervous influences. Experimental irritation of the accelerator nerves or section of the vagus at its roots will increase the rate of cardiac action. In fact, abstraction of vagal influence will permit a pulse of 180. But this rate can be further increased by an interpolation of beats. Auricular fibrillation or

flutter will again increase the frequency. The causes are numerous, and include organic diseases of the heart and large vessels; febrile conditions; vagal compression; organic diseases of the cerebrospinal or sympathetic systems; acute or chronic infective diseases; poisoning by drugs, such as atropine or adrenalin; abuse of tobacco, coffee or tea; reflexes from internal organs; neuroses. There are three kinds of frequent heart action; the temporary, the paroxysmal, and the permanent. They are so familiar that it is unnecessary to consider them at length. In neuroses we usually have efficient remedies in strong coffee or diffusible stimulants, while morphine may be necessary if milder remedies are inefficacious. Assuming that these neuroses may be reflex and due to gastrointestinal intoxication, the salicylates have been used with success. Other intestinal disinfectants may also be effective. If, however, the pulse rate is due to the intensity of the disease, as in febrile conditions, we should not necessarily feel that it must be reduced. A pulse of 120 to 130 does not of itself produce distress. Some years ago I had a patient who came to me with a pulse that was at times above 130. In fact, at the beginning of his treatment it averaged between 125 and 130, but it fell to an average of 111 under treatment, mainly by carbonated baths and resistance exercises. He had locomotor ataxia, luetic phthisis, mitral endocarditis and arteriosclerosis. But even with this complication of diseases he managed to attend to a fairly active business. Death was due to an attack of acute gastritis.

In such instances we should not resort to drugs like hellebore or digitalis merely to reduce the pulse frequency; by so doing we do not gain any useful end, and may do harm.

In emotional patients the environment is to be duly considered. Here also the Nauheim bath is applicable.

The prognosis naturally depends on the cause, as the frequency is merely a symptom, and the expectation of recovery depends on the underlying condition. In chronic cases, like the one mentioned, the prognosis is unfavorable, but temporary or paroxysmal attacks may gradually disappear. Rapidity of the pulse has in itself no direct bearing on the chances for recovery. I once saw in consultation with the late Dr. Heinemann and the family physician a patient with Graves' disease, who was suffering from a paroxysmal attack and had a pulse that could not be counted by the finger. But her family physician subsequently told me that she made a good recovery.

Infrequency of heart action may occur at any period of life, but is usually seen in the decades between twenty and forty. In the adult it is held, somewhat arbitrarily, that a pulse rate below 60 is infrequent, though according to Grob. (*Deutsch, Arch. f. Klin. Med.*, 1888, *XLII, s.* 574), the incidence is as much as one in forty. There are two main varieties, the temporary and the permanent. At the outset we should remember how-

ever, that in apparently good health the cardiac rate may be below 40. Lewis and Prentiss (*Trans. Amer. Phys.*, 1889,*p.* 120) have published such instances, and Vigouroux (*Gaz. des Hopitaux*, 1876, *p.* 788) one of a laborer whose pulse never exceeded 20, but who had never, so far as he knew, suffered from any serious illness. Inheritance plays a part in the matter, and pregnancy as well. Among pathological causes are infections, toxemias, functional and reflex nervous disturbances, diseases of the brain and cord, and organic diseases of the heart.

An instance in this category where the pulse fell to 7½ was published by Holbertson (*Medico-Chirur. Trans., XXIV, p.* 76). There had been a fracture of the occipital bone, with pressure on the medulla, undoubtedly affecting the inhibitory ganglia or their filaments. A rate as low as 4 per minute was recorded by Day. In one of Prentiss's cases, where the pulse fell to 13, there was recovery. In a patient suffering from opium poisoning whom I attended many years ago, there was no perceptible pulse when I first saw him. He was unconscious, and there was only the faintest intimation of respiration, and at long intervals. In fact, he had been pronounced dead by a surgeon some four hours previously, and again somewhat later by a physician who had also been called in. He recovered, chiefly as a result of the energetic use of the faradic battery. In the first case of asystole referred to, I should judge that there was no heart action for at least a minute; it may have been two minutes, or perhaps more, but in such cases one is too much taken up with efforts to give relief to take account of time. The patient recovered under alcoholic hypodermatics and artificial respiration by my abdominal method.

Extra-systoles are due to other than nodal impulses, and may originate in different parts of the right auricle or ventricle; they are then called ectopic impulses. Or they may be due to an irritable vagus, as in tobacco poisoning. As in the normal beat, the ventricle responds to the auricular impulse, but conversely the auricle does not respond to any ventricular excitation.

Extra systoles are due to poisoning by tobacco or chloroform, stimu- by having shorter cycles than their fellows, as well as by other well-known signs. They are apt to be in groups. On the other hand, ventricular extrasystoles show sometimes in a polygram as large atypical beats, and this is one characteristic that differentiates them from the auricular form. There are, of course, other signs also.

Extra systoles are due to poisoning by tobacco or chloroform, stimulation of the sympathetic, toxemias, infections, abuse of digitalis, and myocardial diseases. Undoubtedly there are also other causes. In the treatment digitalis and its congeners are indicated in physiological doses of standard preparations. Nauheim baths are also useful. Rest in bed and regulation of the gastro-intestinal system are likewise important.

Heart block is a condition where the ventricle fails to respond to nodal influences, or the response is irregular. It is often though not necessarily associated with infrequent ventricular action. There are four principal varieties:

1. Acute heart block, usually due to a misuse of drugs.

2. Partial or incomplete heart block, which is shown in two ways. There may be a gradual lengthening of the intervals between the ventricular beats, so that after a time this interval is equal to two beats of the auricle. The result is that a ventricular beat is "missed." This form of missed beat occurs at regular intervals, and can be distinguished clinically by this fact. Then there is the "dropped beat" where at irregular intervals the impulse does not come through.

3. Complete heart block occurs where no impulse is transmitted from auricle to ventricle, and in consequence the two chambers beat independently of each other.

4. The Adams-Stokes complex occurs where the loss of conductivity is associated with syncopal attacks.

Any form of heart block can be made out by taking the pulse with one hand and with the fingers of the other palpating the jugular in the supraclavicular triangle, but the kind and degree of block is better shown by the waves of a jugulo-carotid tracing, as taken by a polygraph, when the a-c interval, or difference in time between the auricular contraction and the carotid pulse will show the lack of conductivity in a precise manner. In all such instances, if we desire to eliminate the vagus as a cause of the block, atropine should be given in 1/60 grain doses, when as a rule the ventricular rate will rise to or towards the auricular. This test should always be made when the ventricular contractions are under 40. The differentiation has an important bearing on the treatment.

Among the most frequent causes of deficient conductivity are syphilis, fibrosis and neoplasms of the heart, diseases at the base of the brain or in the peripheral branches of the vagus, poisoning by aconitine epinephrin, muscarine, physostigmine and digitalin, as determined by experimentation, also asphyxia.

In physiological infrequency of the heart's action we can draw no conclusions as to the expectation of life, for the number of such instances has been limited. But we have no reason to give an adverse prognosis in them, or in the incomplete forms which are probably more common than we have suspected. In Adams-Stokes disease, however, and where the block is permanent, the prognosis is more unfavorable. At the best such patients seldom live more than a few years, though one of my Adams-Stokes cases survived the attack, lived upwards of a dozen years, and most of the time led a tolerably active outdoor life.

Infrequency of the heart's action when physiological, needs no treatment.

When pathological, the underlying disease should claim our chief attention. If the vagus is suspected of being at the root of the difficulty, atropine should be given to determine it. Dock has used the nitrate of strychnine in 1/60 grain doses with benefit in Adams-Stokes disease. My patient already referred to took strychnine sulphate from time to time, the dose varying from 1/60 to 1/40 grain three times a day. But he felt most benefit from the static machine and high frequency current. He also took nitroglycerin. If there is high pressure, this is to be given in doses of from 1/200 to 1/100 grain three times a day. Though digitalis and its congeners are contraindicated in complete heart block, I have used the former advantageously in Adams-Stokes disease, if given with caution. Monobromated camphor, asafetida, valerian, and Hoffman's anodyne, together with resistance exercises and the Nauheim baths, are of benefit in the milder cases. Josué and Godlewski (*Soc. Med. des Hop.*, May, 1913) claim that moderate exercise, even the climbing of stairs, can be made to raise the ventricular rate without risk to the patient, if the exercises are gradual. At any rate, we should not attempt to accelerate the pulse by drugs; experience has amply shown that such treatment brings bad results. In all instances where there is a possibility that syphilis is the cause of the block, a thorough course of anti-luetic treatment should be given.

There is a form of ventricular contraction called hemi-systole, where there is but a single ventricular contraction following two auricular, while alternating with the response of one ventricle there is a response of both. The failure to respond is usually on the part of the right ventricle.

Auricular fibrillation and flutter, and ventricular fibrillation represent various degrees of rapid contraction in the heart chambers. Of these we know little as yet, except as to auricular fibrillation and flutter. The difference between these two is one of degree, not of character, and the separation is artificial. All rapid auricular contractions up to 200 per minute are spoken of as fibrillation and all above that number as flutter. In these instances the ventricle beats less frequently than the auricle. There is therefore some defect in conductivity, or, in other words, incomplete block, fibrilation and flutter may be temporary or permanent. In fibrilation the auricle is in diastole, and a series of tremors pass over it. These wavelets or tremors are shown in the polygram, especially if the wave is magnified. They are best shown, however, by a kymograph running at high speed; the slowed instrument will not show them in the polygram.

Auricular flutter may be physiological. I have seen it in the jugular tracing of a boy of ten who had the juvenile type of arrhythmia. It may be due at times to neurotic conditions. In pathological cases it is usually caused by rheumatism. Perpetual arrhythmia due to auricular fibrillation is the new name given to the former nodal rhythm of Mackenzie, or the permanently irregular pulse of Hering. While the rate in fibrilation may rise to 200 per minute, in flutter it may reach 500 and more.

In the vast majority of instances where the arterial tracing shows that no two successive heart beats have the same length, a diagnosis of auricular fibrillation may be made. Fibrillation is most clearly shown in an electrocardiogram.

Both fibrillation and flutter are best treated by the use of glonoin, digitalin, and strophanthin. I give these in combination, in small doses of 1/100 grain each, repeating at intervals of 4 to 6 hours. By the use of this combination the effect of the digitalis is improved by the more rapid action of the strophanthus and the still more rapid glonoin. By using the mixed glucosides digitalin and strophanthin, no gastric disturbance is produced, and the treatment above outlined can be kept up indefinitely, as is often necessary in the pathological cases. Clinically we know that the permanently irregular pulse must be kept continually under control by digitalis or its congeners. We should have more success with these patients if we could make them understand that their life depends on the continuous use of these drugs, but they tire of constant drugging, and we can hardly wonder at it.

Ventricular asystole or standstill sometimes takes place, as has already been said. Instances of it are rare, but they have been reported from time to time. Lewis, in his recent book (*loc. cit.*), has told of one patient in his practice who had ventricular intermissions of from three to eight seconds, and at the end of the first five seconds unconsciousness, while the auricles continued to beat. Later there was heart block. This patient died, and at the autopsy a sort of nævoid tissue was found in the a-v node. An engorgement of these vessels was thought to have produced the standstill. Laslett (*Quarterly Jour. of Med.*, 1908-9, 11 *p.* 347) has reported a case where there was an intermission in the heart's action of from four to eight seconds. It was due to vagal influence.

My case referred to was also due to vagal influence. With the asystole, which lasted a long time, though I can only guess at the precise period, there was suspended respiration and unconsciousness. But recovery took place, under alcoholics and artificial repiration as already said.

In some domestic animals there may be suspension of heart action of from one to two minutes, and then death ensues. But in some of the cold-blooded species the heart may be kept inhibited for hours by stimulation of the vagus. Mills kept the heart of a terrapin in this condition for four hours (Howell, *loc. cit.*) without causing death.

It is well known that syncope is common in all forms of heart block. In the 2-1 variety the cause may be a sudden increase in the degree of block; in complete dissociation the stoppage may be due to exhaustion of nerve energy. Other causes alleged are cerebral anemia or simply slowing down to an 18-20 pulse rate, which appears usually to be inconsistent with life if the rate is prolonged for any considerable length of time. Or there

may be exhaustion of ventricular energy, due to such rapidity of heart action that the nervous system breaks down under the strain. There is room for abundant theorizing on these points.

But Lewis has proved that ventricular fibrillation can be caused, in the dog at least, by tying a coronary twig, by irritation of a papillary muscle, or the central surface of the right centricle, or its lower angle. Also, experiments on a cat have shown that death from chloroform is attended by ventricular fibrilation. In all of these instances, the fibrilation passed over into delirium cordis. From analogy, therefore, we may believe that delirium cordis in the human being is produced in a similar way. Lewis goes beyond this, and holds that the sudden deaths in convalescence commonly attributed to a clot in the pulmonary or plugging of a coronary are in reality due to ventricular fibrillation. I have held that the determining cause is apt to be degeneration of the myocardial tissue. But the two theories are not inconsistent with each other. We are still very lacking in facts about ventricular fibrillation. Up to the date of writing this article, I know of only one instance of it that has been reported.[1] It was Hoffmann's, and the patient recovered. In treating delirium cordis I fancy we are face to face with it, and yet I feel sure it sometimes yields to treatment, so I do not agree with Lewis's pessimistic view that it is necessarily a precursor of death.

In these instances I use nitroglycerin in repeated doses, without much regard to the quantity, and have been successful. I have had no ill results from the dosage. Sometimes I give it internally in conjunction with amyl nitrite and menthol, in the following mixture, the formula of which is from a London hospital:

Nitroglycerin	gr. 1/100
Amyl Nitrite	gr. 1/4
Menthol	gr. 1/50
Oleoresin of Capsicum	gr. 1/100

This mixture is placed in capsules hermetically sealed. I sometimes give them at intervals of a minute or two, with or without nitroglycerin additionally until an impression has been made on the pulse. I have never known them to do harm. But they should be given under the eye of the physician, and promptly, with regard to the result, not the strength or frequency of the dosage.

But neither digitalis nor strophanthus nor sparteine nor any heart drug that is slow in action should be given in an attack of delirium cordis. They act too slowly to be efficient, and if pushed too actively will produce heart block.[2] I fear that digitalis is too frequently given in such cases, without

[1] Since writing the above I have reported a case in *International Clinics,* Vol. III, Series 25.

[2] I except digipuratum given intravenously.

a proper knowledge of its physiological action. Epinephrin I also place among the dangerous remedies not to be used in such emergencies. I have already called attention to the alarming rise in blood pressure which it produces when injected intravenously, and I have seen a death which I attributed to its use. Forchheimer, our late member, says (*Ther. of Int. Dis., pp.* 100-101) that repeated administration of it to animals causes necrosis of the arteries; and Kauert (*Deutsch. Arch. f. Klin. Med.*, 1910, *s.* 387) that it is contraindicated in organic heart diseases, nephritis and arteriosclerosis, if used intravenously. If used subcutaneously it is comparatively free from danger, but is often inert. As a substitute for strychnine I have used for many years the dried suprarenal gland, in 2½ grain doses, with fairly good results.

THE HEART IN TYPHOID FEVER AND ITS TREATMENT.*

BY ERNEST ZUEBLIN, M.D.,

Professor of Medicine in the University of Maryland, Baltimore.

BALTIMORE, MD.,

This paper is intended as a brief review of the pathological changes and symptoms of the peripheral circulation, of the heart proper, an analysis of the symptoms encountered and treated in a series of personally observed cases at the University hospital. Clinically there is found in all cases examined an acceleration of the pulse rate, not transitory, but persistent for many weeks and months, and out of proportion to the temperature and moderate degree of physical exercise, frequently not influenced by rest. The blood-pressure in most of the cases observed was low, 85 systolic; 66 diastolic. In some instances cardiovascular tonics were given, for instance after pituitrin and epinephrin together a moderate rise in the systolic, a smaller increase in the diastolic, and in the low pulse no pressure could be obtained. Camphor and whiskey increased the pulse pressure, also the systolic pressure. Digitalis and whiskey together lowered the systolic, increased markedly the diastolic pressure, resulting in a notable fall of the already low pulse pressure. Camphor plus digitalis seems to raise all pressures, and where the danger of intestinal hemorrhage can not be disregarded seems not a safe medication. Digitalis also when given alone, presents the same disadvantage, as in one instance an intestinal hemorrhage on the ninety-third day of the disease, preceded by a general rise of the systolic, diastolic and pulse pressure, did not speak in favor of an early use of that drug. The observations made with pituitrin are of interest, since a decrease in the systolic and diastolic pressure, an increase in the formerly very low pulse pressure was noted, the heart and the peripheral vessels seemed to be benefited by that medication, without the risk of an intestinal hemorrhage. The influence of rest and exercise upon the blood-pressure and the bulbus pressure were examined in a few instances, not always with a rise in the systolic pressure, a considerable rise in the diastolic pressure and a reduction of the pulse pressure can be noticed. Bulbus pressure applied after short exercise would suggest an increase of the diastolic blood-pressure, perhaps a frequent fact encountered in connection with the other vasomotor disturbances.

---

*Author's abstract. Read by title.

The presence of a low pulse and low systolic, with a high diastolic pressure, found in the course of the second and third week of the disease, suggest further investigation of typhoid fever cases, as a diagnostic possibility it may help us to foresee and prevent intestinal complications. The study of these cases shows the frequent presence of vasomotor disorders, such as dermographism, even very early after the onset of the disease, persisting for many weeks during and after convalescence. Tremor of the tongue, fingers, etc., irregular respiratory pulse, inversion of the normal type, were frequent in the cases studied. In most instances the "Ashner" phenomenon was abnormal, increased or decreased, tested pharmacologically with different remedies, atropine produced marked slowing, but not much change during bulbus pressure; epinephrin increased the tachycardia, with stimulation of the accelerator nerves; pilocarpin gave a slight decrease in the pulse rate. In all the cases studied changes in the intensity and quality of the heart sounds, increase or decrease, embryiocardia, reduplication of the second mitralis, even simulation of mitral insufficiency was encountered alone or associated with accentuation of the second pulmonic and aortic sounds.

In six cases out of ten the previously normal heart was found considerably enlarged. The enlargement may involve also the right, rarely the left, ventricle. As to prognosis in these cases, usually they recover sooner or later, but still it may be noteworthy to remember the fatal and anatomically well-studied cases reported by French authors (Landouzey, Siredey, Hayem and others). Treatment and prophylaxis deserve more attention. Taking into consideration the cardiovascular symptoms more stress should be laid upon rest, and gradual exercise, controlled by blood-pressure test, closely following the quality of the pulse and the action of the heart itself, gradually leading up to a resumption of the normal routine of daily life. As to the drug treatment proper, the ordinary methods applied to the management of myocarditis must be considered and used according to the individual needs of the case under consideration. Although digitalis may seem to be indicated, as long as intestinal hemorrhage may occur, it is better to withhold or only administer it in small doses. The same reserve is suggested in the use of camphor. Strychnine is best reserved for special indications. When low blood-pressure prevails the use of alcohol is better restricted, though in combination with digitalis and camphor it may present the rise of the systolic pressure, likely to be expected from the latter medication. Pituitrin given alone in cases of weak heart and imminent intestinal hemorrhage, may prove equally efficient; while the effect of epinephrin seems transitory and even an undesirable stimulant to the accelerator nerves. The combination of epinephrin with pituitrin seems of interest, as there was a coincident drop in the febrile temperature.

Atropine (as in the one instance tried) may be followed by a tachycardia; whilst aconite seems to depress the temperature and pulse rate. The results of my personal observations are submitted more as an incentive to further these desirable studies, in the hope of finding suitable means for the prophylactic and curative treatment of the many cardiovascular disturbances which are so easily overlooked by the time-saving practitioner.

THE MEDICINAL AND HYGIENIC TREATMENT OF AURICULAR FLUTTER.*

BY LOUIS FAUGERES BISHOP, A.M., M.D.,

Clinical Professor of Heart and Circulatory Diseases, Fordham University School of Medicine, New York City; Physician to the Lincoln Hospital.

NEW YORK CITY,

Auricular flutter is perhaps the latest condition to become thoroughly established in cardiology and is defined by Ritchie who has written a monograph on the subject, as "a pathologic action of the auricles characterized by rhythmic co-ordinate contractions of their musculature at a rate that is greatly accelerated, and is usually between 250 and 300 per minute."

The profession has become familiar with the problem of auricular fibrillation. I will not touch upon this nor upon all the interesting theoretical considerations involved, but proceed at once to the topic of my paper founded upon experience in my practice which has for some years been exclusively devoted to the treatment of cardiovascular conditions.

I want to emphasize particularly the points that have not been specially emphasized by other writers. Hence, I will begin with the hygienic treatment.

To understand my viewpoint it is necessary to reiterate the cellular theory of cardiovascular-renal disease, which I have adopted and which has led to fruitful results in the treatment of many conditions which were apparently destined to be progressive.

This theory predicates a general condition as the underlying cause of damage of particular organs, and while it does not deny the existence of organic disease in a single organ as an entity, it takes account of the comparative rarity of this occurrence. It takes account of the wide margin of safety in organs which prevents them from giving symptoms ordinarily until their resources have been drawn upon for a long time and to a high degree. It takes account of the relatively conspicuous processes of gastro-intestinal digestion and the absence of external evidence of the digestion by the individual cell of protein, upon which the life of the cell must depend. It emphasizes the relatively greater importance of metabolism over gastro-intestinal digestion in diseases of the heart. It takes account of the

*Read by title.

phenomena of cell sensitization to particular protein, which it predicates as the primary occasion for the development of the majority of cardiovascular-renal break-downs.

In addition to this, with particular relation to the disturbed physiology of the auricles, it must be remembered that the heart beat is essentially a chemical phenomenon—hence, particularly susceptible to derangement from chemical causes.

For some years the author has taught that the fibrillating auricle was primarily a poisoned auricle, and the same seems to be true of auricular flutter. After the primary control of the ventricular rate by digitalization, according to methods now well understood by cardiologists, in spite of the resulting irregularity—it is the author's custom to apply the following strict regimen which he has found so valuable in arteriosclerosis, namely:

Full doses of castor oil according to the plan of the following formula:

℞ Tincture of Iodine ..... ʒi m xx
Menthol ..... gr. xvi
Castor Oil ..... ℥ viii

Two tablespoonfuls June 22, 29, July 1, 7, 21, Aug. 11, Sept. 8, and once each month thereafter.

(2) This is supplemented by graduated out of door exercise. The patient walks as much as he can without distress, commencing with a short distance and gradually increasing it.

(3) Eggs, fish, meat and stock soups are excluded from the diet, in connection with the ordering of which I use the appended diet sheets

For..... Diet to be followed

from..... to.....

(Articles not crossed off are permitted)

SOUPS
(Purées and Creams)
(without stock)

Barley
Rice
Pea
Bean
Potato
Tomato
Asparagus
Onions
Celery

VEGETABLES
(Starchy)

Rice
Corn
Peas
Beans
Lima Beans
Lentils
Potatoes
Baked
Boiled
Mashed
Chopped
Sweet Potatoes
Beets
Parsnips
Turnips
Carrots
Kohl Rabi
Artichokes
Salsify
Radishes

MILK

Unskimmed
Skimmed
Buttermilk
Cream
Boiled Milk
Pasteurized

GREEN VEGETABLES

Tomatoes
Raw
Stewed
Baked
Egg Plant
Baked
Onions
Boiled
Baked
Leeks
Cabbage
Sauer Kraut
Cold Slaw
Cauliflower
Brussels Sprouts
Sea Kale
String Beans
Asparagus
Pumpkins
Squashes
Celery
Raw
Stewed
Rhubarb
Vegetable Marrow
Spinach
Lettuce
Water Cress
Beet Tops
Okra
Capers
Cucumbers
Endives
Chicory
Sorrel

BUTTER

CHEESES
(Select a suitable variety and use as meat substitute)

PREDIGESTED FOOD
(Except eggs and meat)

SPECIAL

Fresh Baked
Stale
Toasted
Pulled
Zwieback
White Flour
Graham
Rye
Crackers
Gluten
Almond
Inulin
Soya
Aleuronat

CEREALS

Oat Meal
Corn Meal
Hominy
Arrowroot
Tapioca
Cornstarch
Farina
Sago
Macaroni
Spaghetti

CAKE
(Without Eggs)

Plain
Fancy

PASTRY
(Without Eggs)

ICE CREAM
(Without Eggs)

Vanilla
Chocolate
Fruit Flavors

BREAD

Milk Toast
Toast Water
Barley Water
Gruel
Irish Moss
Flaxseed Tea
Koumiss
Panada

PUDDINGS
(Without Eggs)

Bread
Cornstarch
Blanc Mange
Rice
Tapioca
Junket
Cottage
Hasty
Suet
Fruit

WATER ICES

Orange
Lemon
Sherbert

JELLIES
(Made with Vegetable Gelatines)

Lemon
Wine
Fruit

SUGARS

Cane Sugar
Grape Sugar
Honey
Molasses
Confectionery
Levulose
Saccharin

FRUITS

Oranges
Lemons
Limes
Shaddocks
Grapes
Bananas
Pineapples
Melons
Fresh
Dried
Stewed
Preserved
Apples
Peaches
Pears
Plums
Prunes
Apricots
Cherries
Raisins
Dates
Figs

BERRIES

Strawberries
Blackberries
Raspberries
Huckleberries
Gooseberries
Cranberries
Mulberries
Currants

NUTS

Cocoanuts
Chestnuts
Walnuts
English Walnuts
Brazil Nuts
Hazel Nuts
Pecans
Shellbarks
Salted
Peanuts
Almonds

BEVERAGES

Coffee
Tea
Chocolate
Lemonade
Grape Juice
Ginger Ale
Soda Water

CONDIMENTS

Pepper
Mustard
Spices
Herbs
Vinegar
Olive Oil
Horseradish
Sauces

SALADS

POULTRY

(Only when Specially Ordered)

Chicken
Squab
Turkey
Duck
Goose
Guinea Fowl
Birds

Olives
Pickles
Mushrooms
Truffles

GENERAL INSTRUCTIONS:

The diet ordered is for you for the present time and has nothing to do with the requirements of other people, or of you, under other circumstances.

Avoid all eggs (and dishes made with eggs) fish, meat and stock soups, except as specially ordered.

Eat five small meals a day; masticate thoroughly.

Take fluids very moderately at meals.

Do not partake of a great variety of dishes at any one time, nor eat large quantities of anything.

Rich dishes, fried food, pastries, sweets, stimulants and strong condiments should be used only in small amounts.

Any articles found to be habitually disagreeing are to be avoided.

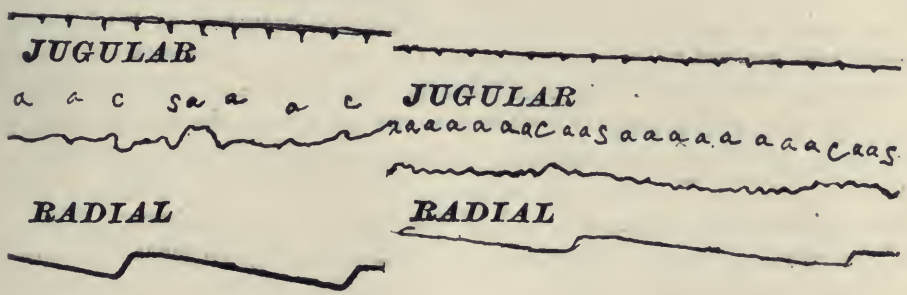
If your weight, the color of your blood, and your endurance remain the same you are getting enough food.

The more you were poisoned by an article of food, the more it may be missed when it is taken out of your diet.

In thus extending to a specific disorder of the cardiovascular system, represented by auricular flutter, my general theory of cardiovascular disease, in its treatment I am supported by excellent results in a number of cases which it does not seem to me would have done as well under any other regimen.

True auricular flutter is, of course, a comparatively rare condition, so none of us have a very extensive individual experience with it. I have over 1,500 tracings taken from cardiovascular cases with the McKenzie polygraph. Among these are a few examples of auricular flutter, which were satisfactorily recorded with this instrument though, of course, our knowledge of this disease is primarily founded on the work of the electrocardiograph.

The most interesting of all my patients was one observed this winter: A young woman, twenty-six years of age, who had apparently suffered from heart block since childhood. Under careful supervision she had gotten along pretty well, but had suffered a deterioration of conditions which were unaccounted for by any symptom until the polygraph revealed the onset of auricular flutter. I am publishing with this paper a portion of the tracing. In the tracing the flutter is distinctly evident in the jugular tracing, particularly during the beginning of expiration.



THE PRESENT STATUS OF THE SURGERY OF THE HEART.

BY W. WAYNE BABCOCK, M.D.,

Surgeon to the Samaritan and Garretson Hospitals,

PHILADELPHIA, PA.

In the pride of having completed his treatise on surgery, Samuel D. Gross turned to his assistant and said, "Tom, what would the surgeons of twenty years ago say if they could but come back and read my book?" "They would say," replied Dr. Andrews, "precisely what you would say, could you but return twenty years hence and read the surgical writings of that day." Prof. Gross would find that in no field has surgical genius devised or suggested more daring or startling procedures than those of the last twenty years in connection with the surgery of the vascular system.

Sherman (1902) has said that "The road to the heart is only two or three centimeters in length, in a direct line, but it has taken surgery nearly 2,400 years to travel it." We might add that it has taken surgery nearly 2,400 years to start to travel, for the possibility of operating on the human heart was derided by as recent a master as Billroth, and it was not until 1881 that it was forecast as a possibility by John B. Roberts (*Ann. of Anat. & Surg.* Dec. 1881), and 1882 when first proved by the animal experimentation of Block (*Des indications de la digitale dans les maladies du coeur. p.* 182 *pp. III*). The twentieth century had nearly dawned (1896) when Farina (*Clin. Chir. Milan,* 1903 *XI,* 361) did the first cardiorrhaphy. Much of the work on cardiac surgery is so recent that many methods and possibilities demonstrated as feasible in the laboratory have not as yet been transferred to the surgical clinic, and the internist unaware of the possibilities in a resort to surgery continues to permit patients with certain forms of heart disease to perish without any effort at relief. It is quite proper, therefore, that we at this time review briefly the possibilities that open to us in the treatment of cardiac disease or injury.

First of all it should be emphasized that the human heart is more tolerant of surgical manipulation than that of the dog or cat, and apparently any operation that may be performed successfully on these lower animals, may with even greater hope of success, be carried out upon the human heart. Experimentally the mammalian heart may not only be punctured and sutured, but aided by a special technique different from that employed in abdominal surgery, it has been shown that cardiac pulsations may be restored even after hours of cessation—that the great pedicle of the heart

may be temporarily ligatured or clamped, permitting the great vessels or the cavities of the heart to be opened for the removal of clots, or other procedures, the valves to be exposed, sutured or divided; or the orifices of the heart to be dilated, divided or enlarged by the implantation of tissue. It has also been shown that muscle may be implanted to fill defects in the walls of the heart, that the coronary vessels may be ligatured, or aspirated for air embolism, and that the harmful effects of adhesions upon the heart may be overcome. Some of these procedures already have had a clinical use and there is no reason to doubt that any of them can be employed in human practice.

Technical Considerations

Anesthesia—Local anesthesia or paravertebral nerve blocking with a one, one-half, or a one-quarter per cent. novocain solution is to be preferred for the chest wall. No anesthetic is required for the heart proper. At times an associated moderate narcotism with scopolamine-morphine is desirable. or a slight ether narcosis which is also to be preferred where haste is essential. An emergency operation upon a shocked and semi-unconscious patient may require no anesthetic. If the pleural cavities are to be invaded, intratracheal insufflation after the method of Meltzer- Auer (*Jour. A. M. A.*, August 12, 1911, *also LX*, 1914) has advantages.

To restrict the inhibitory action of the vagus, a preliminary injection of atropine may be given subcutaneously, while cardiac massage and the intravascular injection of epinephrin are most valuable methods in starting the arrested heart. An excess of epinephrin, however, is dangerous both from the vascular strain imposed, and the danger of pneumogastric exhaustion.

Operative Technique—Carrel (*Surg. Gyn. & Obstetrics*, 1914 *XIX*, 226) has shown that a more delicate technique is necessary in handling the pleura and pericardium than the peritoneum. Abandoning the use of petrolatum coated silk which he formerly employed, he walls off the pleural cavity and the operative field first with towels of Japanese silk, and then with small cotton pads incased in fine silk. Only the field of operation is left exposed to the air and in view of the operator. Ordinary gauze or toweling should not be brought in contact with the delicate serous surfaces. Rubber gloves should be worn. In order to hold the slippery heart, the linen gloves suggested by Sauerbrauch may be supplanted by those made of fine silk worn over thin rubber gloves.

Access—The heart is largely overlapped by the edges of the lungs, especially during forced inspiration. Only over a narrow triangular interval is the lower part of the anterior pericardium in contact with the chest wall. For drainage purposes the pericardium may be entered through the left costo-xiphoid angle, displacing or dividing the triangularis sterni with or

without section of the seventh and sixth left costal cartilages. A more complete exposure may be obtained by splitting or resecting the sternum, or by raising a flap of skin and portion of underlying cartilages, ribs or possibly the sternum according to the requirements of the special case. If a flap is used, one hinged on the outer side is usually preferable. The pleurae, lungs, internal mammary artery and diaphragm are to be avoided. Except for the additional time required, there is no objection to dividing the internal mammary artery between ligatures. On opening the heart, the entrance of air into the right ventricle and lungs is less dangerous than into the left ventricle and coronary arteries. The left ventricle must therefore be carefully aspirated before closing, and if air bubbles are noted in the coronary vessels, they should instantly be removed by aspiration through a No. 16 hypodermatic needle. The entrance of air into the coronaries is a cause of the very dangerous cardiac fibrillation.

Pericardium—Werelius (*Jour. A. M. A.*, 1914, *LXIII*, 1338) found that no special harm resulted when the pericardium was extirpated, the surface of the heart remaining smooth and usually contracting no very marked adhesions. It is important in suturing the pericardium that constricting tension is not brought upon the heart especially near the base. The entrance of blood into the pericardial sac tends to compress the auricles, and finally to arrest the circulation, through the so-called *"heart tamponade."* Although the blood pressure is lowered, the circulation is not interrupted by injecting air alone into the pericardial sac.

Control of the Cardiac Circulation—Rehn (*Zur Chirurgie des Herzens und Herzbeutels, Verhandl, d. dut. Gesellsch. f. chir.* 1907, *XXXVI pt.* 2; *Archives f. klin. chir.* 1907 *LXXXIII*) in 1907 showed that hemorrhage from the heart could be controlled by compressing the venæ cavæ at their entrance into the right auricle. The veins may conveniently be compressed between the little and ring fingers of the left hand, upon the palm of which the heart rests. Partial compression is tolerated by the dog's heart up to four minutes, and total compression up to one and one-half minutes. The human heart is probably more tolerant. Sauerbruch (*Die Verwendbarkeit des Unterdruckverfahrens im der Herzchirurgie. Archives f. chir.* 1907, *LXXXII; Verhandl, d. deut. Gesellsch f. chir.* 1907 *XXXVI pt.* 2) and Von Hacker (*Experimentelle Studien zur Pathologie und Chirurgie des Herzens, Archives f. klin. chir.* 1907 *LXXXIV*) found that almost complete arrest of heart action could be produced for ten minutes without fatal consequences, while Laewen and Siewers (U, *t. schr f. chir. Leipz.*, 1908, *XCIV*, 580-599, 1 *pt.*) in 1908 occluded the pulmonary artery and aorta without death for six minutes in rabbits, although after one minute evidence of damage to the brain was noted. Compression of the venæ cavæ alone was followed by damage to the brain after nine minutes. It is probable that the circulation of the human heart may be arrested for from three to five minutes without fatal injury. Complete arrest of circulation in the brain

is followed by death of the cortical cells after about seven minutes, and this effect upon the brain is the most serious obstacle to the interruption of the heart action. A convenient method of temporarily arresting the circulation is by compressing the great pedicle of the heart by a rubber covered Doyen clamp, as used by Carrel.

Incisions—Incised wounds up to 2 mm. in length through the left ventricular wall, close almost immediately, although similar wounds through the right ventricle or auricles may result in a fatal hemorrhage. From the left ventricle the blood is ejected in strong systolic spurts, while the flow from the right ventricle and from the auricles is almost continuous. Ligation of one coronary artery is not necessarily fatal. In Stewart's case (*Amer. Jour. of Surg.* 1913, *LVIII, p.* 67-85) the patient lived for several years, and at the autopsy, only a moderate fibrous degeneration near the apex of the heart was found. In several other cases no very serious consequences were observed from injury or ligation of a coronary artery. Much depends, however, upon the point of ligation and the extent and location of the ischemia produced. An involvement of the Kronecker-Schmey centre in the auriculo ventricular groove is fatal.

Cardiac Resuscitation—The contractions of the arrested heart may be restored by

1. *Inversion of the patient.*

2. *Rythmic compression or percussion* of the overlying chest wall especially in children.

3. *Needling the heart* or aspiration of the over-distended right auricle or ventricle, which is a dangerous procedure. In Sloane's case, however, in attempting to tap a pericardial effusion, the trocar entered the right ventricle and eight or ten ounces of blood escaped. On withdrawing the trocar, the patient. a girl of 19, supposedly dead, had resumption of heart action and recovered. In a number of instances, however, fatal hemorrhage has followed the aspiration of the heart, and the method in general is to be condemned.

4. *Injection of drugs into the heart wall* or cavities. In a few instances in which other measures have failed, we have injected epinephrin or barium chloride solution directly into the walls or cavities of the heart but without effect. In animal experimentation these procedures have been found useful.

5. *Electrical Stimulation of the Heart* by an electrode introduced through the chest wall against the heart, has been found very efficient in lower animals, but is not usually instantly available as it must be for human practice.

6. *Injection of Physiologic Saline.* Locks, Ringers' solution, or especially epinephrin into the blood stream. By perfusion Kubliabko (*Pflugers' Archiv. XLVII,* 1902) in 1902 was able to produce contractions of the extirpated human heart 30 hours after death. The epinephrin becomes effective on entering the coronary vessels and is especially useful

when injected against the circulation into the carotids (*Crile,* 1908). It is more conveniently and safely given, however, by introducing the solution into a vein of the arm. We employ a simple funnel and needle connected by six feet of rubber tubing. The funnel is filled with saline solution and from one to sixty drops or more of a 1 to 1000 epinephrin solution added, according to the exigencies of the case. As soon as the pulse returns the flow of the solution is arrested, to be resumed only in case the heart action again fails. An overdose of epinephrin is dangerous, as has been mentioned, and several times we have felt the patient's body and even the operating table vibrate from the violent contractions of the over-stimulated heart. The duration of the epinephrin stimulation rarely exceeds one-half hour. In about twenty cases, in only one did I find the intravenous injection inefficient, and in this case the injection into the carotid likewise failed.

7. *Cardiac Massage.* (*Schiff* 1874). This may be carried out in one of four ways:

(a) *Abdomino-subdiaphragmatic massage.* The hand is introduced through an abdominal incision carried above the left lobe of the liver, the heart grasped through the diaphragm and compressed 20 to 40 times per minute. The procedure is favored by using the opposite hand externally for counter pressure. This method has given the best results clinically, especially when associated with the intravascular injection of epinephrin. In three of our cases in which there was complete arrest of heart action for ten minutes or more, it was found that the cardiac massage was insufficient without the intravascular injection of epinephrin or vice versa. In one case the cessation of the heart and respiratory action occurred in a woman of about forty years, during the administration of nitrous-oxide-oxygen. About ten minutes elapsed owing to delay in introducing the epinephrin before the resumption of cardiac contractions. Later the respiration was resumed but the patient developed repeated clonic spasms, did not regain consciousness, and died about sixteen hours later.

Cardiac massage may fail apparently from an imperfect technique. Thus in a second case I entered an operating room in time to observe a sudden cessation of respiration and circulation under ether. The operation was a simple abdominal one, upon an apparently robust woman of 28. At the request of the operator, we started artificial respiration, had an assistant to practice cardiac massage through the abdominal incision, and injected epinephrin solution into a vein in the arm. Ten minutes having passed without cardiac pulsation, I disregarded an insufficient aseptic preparation, introduced a hand into the abdominal cavity and started cardiac massage. Only two or three compressions of the heart were required to start contractions, and after working about thirty minutes with artificial respiration, including a final tracheotomy and forced insufflation, the patient started to breathe spontaneously. This patient died with pulmonary edema about seven hours

later, without regaining consciousness. Cardiac massage and the intravascular use of epinephrin should not fail to restore cardiac pulsations if used within twenty minutes after somatic death, unless the patient is exsanguinated.

A third patient previously reported, (*Babcock, Monthly Cyclo. & Med. Bull.* Dec. 1912) an obese colored woman, had cessation of the heart and respiration during an operation under spinal and narcotic anesthesia, for a very large fibroid tumor. Owing to repeated failures to properly introduce epinephrin solution into the veins twenty-five minutes elapsed before the cardiac massage produced any response, and about thirty-five minutes before the respiratory function was resumed. This patient lived about two days, but did not regain consciousness, and finally died of pulmonary edema. In a patient prepared for Caesarean section first seen about thirty minutes after circulatory failure, and in one exsanguinated patient, I was unable to start pulsations. On the other hand we have had several successful resuscitations where the somatic death had existed less than seven minutes. These experiences emphasize the importance of accuracy and haste in restoring the cardiac contractions, and bear out the belief that the cortex of the brain does not survive complete anemia for over seven minutes, and even though patients who have had complete arrest of heart action for longer periods of time, may be partially revived, they do not regain consciousness and always die. It is important therefore, that well trained assistants and sufficient apparatus to be instantly available, should be at hand whenever general or spinal anesthesia is induced, or whenever a serious operation is undertaken.

(b) *Extraperitoneal subdiaphragmatic massage* suggested by Tomaselli is a modification of the abdomino-subdiaphragmatic method mentioned above. As a rule, it is not to be considered, as other methods may be employed more conveniently, and are equally effective.

(c) *Transdiaphragmatic massage,* in which the hand is carried from below through the diaphragm, is never necessary, and should not be employed.

(d) *Transthoracic massage.*—As usually employed, several costal cartilages or ribs are resected, the hand introduced into the chest cavity, the heart grasped between the thumb and fingers and rythmically compressed. The opening of the thorax, the possible production of pneumo-thorax, the irritation of the pericardium and pleura and the time consumed are serious objections to this method, although it is the method to be employed when the heart has already been exposed. In most other cases, the abdomino-subdiaphragmatic method is preferable. In several instances I have been able to temporarily restore cardiac action by introducing a finger through a stab wound in the fourth intercostal space, two inches to the left of the sternum, hooking the finger about the left ventricle, and intermittently com-

pressing the heart against the overlying chest wall. In no case did a permanent recovery follow, however, and care must be taken that the stab does not involve the wall of the heart. In a case of sudden death during the evacuation of an enormous empyema, cardiac massage by a finger through the fourth left intercostal space failed. A puncture was then made at the right border of the enormously dilated heart, and with fingers simultaneously compressing each side of the heart, the pulsation was restored. Unfortunately the pulmonary complications were such that we were unable to produce artificial respiration, and the heart action gradually failed.

Cardiac massage is useful: First, by mechnically stimulating the heart; Second, by relieving the paralysis of the heart, due to over-distension; Third, by maintaining at least a partial circulation especially to the cerebral cortex which is so important for the preservation of life; and Fourth, by aiding the entrance of epinephrin or other stimulant into the coronary circulation. While cessation of the heart is only tolerated for a few moments, the cessation of respiration may continue for a much longer period of time, and is usually less serious. In operating upon the heart, when about to artificially arrest the heart action, it is wise to first over oxygenate the blood.

Sutures—In suturing the heart, although catgut has been employed, fine china silk is more permanent and less likely to untie, and as a rule, is to be preferred. Continuous sutures may be more rapidly introduced, and distribute the tension more evenly than do interrupted sutures. In introducing the sutures the heart may be supported on the hand, or given a measure of fixation by traction on the suture ends or upon special guide sutures. It is difficult in the presence of the usually associated tachycardia, to time the introduction of the needle with systole or diastole. In suturing care should be taken to avoid the coronary arteries and the suture should be carried down to the endocardium but not through it. The hemorrhage may be lessened during the operation by pressure over the wound and by lifting the heart through the opening of the chest wall. A preliminary aspiration of the pericardium may be desirable to relieve the patient of "heart tamponade." Excessive traction of the pedicle of the heart or rough manipulations are, however, dangerous. Injury to the auriculo-ventricular band of His is specially dangerous and this region should be carefully avoided, in operations. Laotta (*Policlinics,* 1913 *Vol. XX*) in two hundred and thirty-six cases in which the heart was sutured, found that forty-four and ninety-one one-hundredths per cent. recovered. Single wounds and wounds of the left ventricle gave better results than wounds of the right ventricle or of the auricles.

Drainage should only be employed in the presence of sepsis. Antiseptics should never be used in the pericardium. Sudden death has followed their use.

Congenital Anomalies—We are approaching a time when certain congenital anomalies of the heart may be considered from a surgical view

point. Although it does not seem feasible to operate for persistent foramen ovale, it would seem possible to ligate or occlude a persistent ductus arteriosis.

Kirmisson has reported a case in which a child was born with the apex of the heart protruding through a defect in the left upper part of the sternum and overlying skin. The heart was replaced in the thoracic cavity, the gap covered by a large skin flap, and the patient has since reached adult life and borne children without evidence of harm from the absence of the pericardium. For the rather unusual condition of abnormally mobile, movable, or wandering heart, where rather serious symptoms are produced by change of posture, surgical methods of support or fixation may be considered. The base of the heart may be fixed by sutures, the pericardium fastened to the overlying chest wall, or strips of pericardium used for suspension. One may also consider the support of the heart by the subserous transplantation of masses of fat. There is experimental evidence showing the feasibility of using strips of pericardium.

Paracentesis Pericardi—In puncturing the pericardial sac, an endeavor is made to avoid injury to the internal mammary artery, the pleura, lungs, and heart, and to secure the most efficient evacuation of the fluid. The best area is through the costo-xiphoid notch, close to the ensiform cartilage or the fifth or sixth left interspace outside the mammary line. To the left of the sternum, the third, fourth, fifth, sixth and seventh, intercostal spaces have been suggested, and to the right of the sternum, the fourth and fifth intercostal spaces have also been advised. To avoid the internal mammary artery, the puncture is made close to the sternum, or at least one inch distant from it. There seems to be little danger from injury to the pleura or lungs. Local anesthesia is to be preferred. For septic accumulations pericardiotomy is to be preferred.

Pericardiotomy—This is employed chiefly to provide drainage in cases of purulent pericarditis. The operation may be performed, as first suggested, by a trephine opening through the lower part of the sternum, or a resection may be made of the lower end of the sternum and ensiform. The best incision is in the costoxiphoid angle and may or may not include a resection of the seventh, or seventh and sixth left costal cartilages. Tubular drainage by one or more soft tubes introduced into the lower part of the pericardial cavity is usually preferred. If irrigation of the pericardium is employed which is rarely desirable only non-irritating solutions should be used. Of twenty-two cases reported by Elliott there was a mortality of about thirty-two per cent., which is not excessive considering the very high mortality of purulent pericarditis. In two cases of tuberculous pericarditis, Rochard, Jacob (*Bull. et mem Soc. de Chir. de Paris* 1913, *XXXIX*, 752) pericardiotomy without drainage was followed by recovery.

Adhesive Pericarditis, Cardiosymphysis, Adhesive Pericardiomediastinatis—Pericarditis may be of an external or internal type. When of ad-

vanced degree, the chest wall, heart, and mediastinum are bound together by fibrous tissue. In some cases calcification of the newly formed connective issue, *concretio pericardi* also occurs. The fibrous tissue often invades the muscular walls of the heart and the organ is so bound and restricted as to be greatly hampered in its work. The descent of the diaphragm may be prevented and respiratory movements limited. Hypertrophy of the heart and circulatory insufficiency are present and are indicated by an increased area of cardiac dullness, great edema, especially of the upper part of the body, enlargement of the liver, and ascites. In children ascites, increase in the area of liver dullness, puffiness of the face, cyanosis of the face and ears, with slight diminution in the pulse rate, and nearly normal heart sounds have been mentioned as almost pathognomonic. Invariability of the area of cardiac dullness, systolic retraction about apex, diastolic shock, and Broadbent's sign, or a systolic retraction about the eleventh and twelfth ribs posteriorly may be elicted. Systolic retraction of the lower costal and epigastric regions may be noted, with gallop rhythm, duplication of second sound, paradoxical pulse and respiratory swelling of the jugular.

In treating the condition DeLorme (*Gaz. d'hop.* 1908 *m.* 125) suggested that the pericardium be opened and the adhesions separated by the finger or scissors. On the postmortem table Kocher has shown that separation of adhesions usually produces serious injury to the walls of the heart, and it is evident that the divided adhesions may later reform. The best method of treatment consists in mobilizing the overlying chest wall, or cardiolysis, suggested by Brauer (*Archiv. f. klin. Chir.* 1902, *Bd LXXI* s. 258) in 1902. The operation may be carried out under local anesthesia and consists in raising a flap of skin, and excising portions of the third, fourth and fifth costal cartilages and ribs that overlie the enlarged heart. To avoid injury to the pleura, the posterior layer of perichrondrium is left. Some operators consider a subperiosteal resection of three ribs or cartilages sufficient. The operative mortality is about five per cent. and the reported results of the operation are exceedingly good. Lacheme (*La Cardiolyse on operation de Brauer; ses indication et ses resultats Arch. d. mal. du coeur,* (*etc.*) *Par.* 1909, *II,* 673-683) collected twenty cases of cardiolysis without mortality, and found that dyspnea, edema, pain and hyperemia of the viscera, were relieved by the operation. In thirty-eight cases Delageniere (*Archiv. pro. de Chir.* 1913, 317) there were thirty-one successes, six failures and one operative death. It is evident that the operation should be done more frequently.

Alexander Morrison (*Proc. Roy. Soc. of Med. Lon.* 1914-15, *VIII, clin sec.* 21) has reported marked improvement following this operation in a case of marked cardiac hypertrophy from aortic valvular disease, in which there were no adhesions, and advocates the operation for similar conditions.

The operation has also been successful for uncontrollable asystole (Weil, Leriche and Mouriguarrd, *Lyon Med.* 1914, 246).

Wounds of the Heart—In rather rare instances serious hemorrhage has occurred from wounds of the pericardium alone. As a rule marked hemorrhage after a penetrating wound of the chest indicates injury of the internal mammary artery, the heart, the great vessels or the lungs. Myocardial wounds may cause death by hemorrhage and surgical anemia, or by producing cardiac compression in a closed percardium. Corresponding wounds of the right ventricle bleed more profusely and are more dangerous than those of the left ventricle, because of the greater thickness of the walls and the greater size of the columnæ carnæ of the left ventricle, favoring thrombus formation. Likewise wounds of the auricles are more dangerous than those of the ventricles. Wounds of the interventricular septum are not so dangerous as those that open the cavities, providing they are not complicated by wounds of the coronary arteries. When the larger branches of the coronary artery are involved, secondary myocardial degeneration may be expected, although this does not invariably occur. Wounds of the auriculo-ventricular septum involving the bundle of His may cause sudden death.

Gunshot wounds are more dangerous than incised wounds. Fischer (*Archiv. f. klin. chir.* 1868, *Bd IX*) in 1867 from a study of 452 heart wounds found that from seven to ten per cent. are followed by spontaneous recovery. Loyson (*Reveu de chir.* 1889 *p.* 774) has reported nine recoveries after twenty-three needle punctures, eleven recoveries after nineteen stab wounds, and three recoveries after 110 unsutured gunshot wounds of the heart.

Of operations for wounds of the heart Vaughan (*Jour. A. M. A.* Feb. 6, 1909) has collected 150 cases, with thirty-five per cent. of recoveries as compared with fifteen per cent. of recoveries without operative treatment. Miller found fifty-three per cent. of recoveries in fifty-one more recent operative cases that he collected. Of the last ten of these patients nine recovered. Bullets or other foreign bodies may remain imbedded in the pericardium for years. In Ticque's case, the bullet remained encysted in the pericardium for fifty-two years.

Beaussanat (*Bull, acad. de med. Paris,* 1915 *LXXIII* 554) removed a metal fragment weighing 1.5 grams that had entered the right ventricle four months before from the explosion of a grenade. There was marked dyspnea and præcordial distress aggravated by movement or speaking. The heart was fixed by two silk sutures, the ventricle incised and the foreign body removed, with recovery.

Often suppurative pericarditis, demanding drainage, results from the presence of foreign bodies.

The Diagnosis of wounds of the heart may be difficult. In seven of Stewart's (*Amer. Jour. of Surg.* 1913, *LVIII, p.* 67-85) twelve cases, on

exposing the heart no injury was found. *The symptoms* vary from instant death to a disability so slight that the patient continues to walk about, ultimately recovering or dying after several hours or days with the pericardium and possibly also the pleura filled with blood. Usually there is marked præcordial anguish, pallor, shock, collapse, and at times unconsciousness. The patient may show great restlessness and anxiety and develop convulsions. Vomiting, which may be repeated and suggest abdominal injury, and involuntary dejections frequently occur, or hemoptysis from an associated wound of the lung. There is usually marked dyspnoea, with rapid shallow respirations, and the development of cyanosis. The blood pressure rapidly falls, the pulse is weak and irregular, or lost. Locally, there may or may not be hemorrhage from the wound. The area of cardiac dullness is increased, the apex beat often cannot be felt, and there may be signs of free fluid, or free fluid and air in the pleural cavity. On ausculation the heart sounds may be clear, altered, or imperceptible. The heart action is often intermittant or irregular, and splashing, blowing, or metallic ringing sounds may be heard. The symptoms may improve for a time to recur with increased severity or to be followed by sudden death from return of the hemorrhage.

If recovery occurs, weakness, vertigo and irritability may persist for weeks and months, or the patient may yet face the danger of pyopericardium, pericardial adhesions, hypertrophy, softening and aneurismal dilation of the ventricular walls, or endocardial disease.

Rupture of the Heart or its valves may occur from blows or falls upon the chest without an open wound, as well as from disease. Missiles entering the chest wall but without entering the pericardium may rupture the heart. In thirty-eight cases of rupture of the valves collected by Barie ten were traumatic. The aortic and mitral valves are most frequently torn. Rupture of the heart without an external wound gives a very high mortality, a correct diagnosis being rare during life, and surgical intervention almost never considered. Operation should be invoked for these otherwise fatal injuries. Progressive dilation or aneurismal distension of the walls of the heart may be combatted by suturing reinforcing strips of fascia or excised blood vessel wall over the weakened area. It is to be regretted that these measures are not more frequently considered.

Operations on the Valves and Orifices of the Heart—Experiments in lower animals have proved the feasibility of the following operations for stenotic conditions. *First,* introduction of a fine hook-shaped knife through the aorta and incision of the aortic valves or ring, as performed by Cushing.

Second, incision into the right or left ventricle and the divulsion of the mitral or tricuspid orifice by introducing and opening a hemostatic forceps, as successfully performed by Werelius.

Third, suture of three sides of a rectangular patch taken from another blood vessel over a section of the aortic ring and adjacent portions of aorta and left ventricle. Introduction of a special pair of scissors under the free edge of the patch, puncture of the ventricle with one blade and division of the aortic ring, with final suture of the remaining edge of the patch. This operation has been carried out successfully in animals by Carrel (*Ann. of Surg.* 1914 *LXI*) without arresting the circulation. In two cases of advanced mitral stenosis I suggested introducing a fine curved probe-pointed knife through the left ventricle for division of the contracted mitral ring. In both instances, however, the operation was refused, the first patient dying a few days later from the progress of the disease. As incompetency is much less serious than stenosis, such a relatively simple procedure would seem well worthy of consideration.

Other operations upon the valves of the heart have been successfully performed upon animals by Carrel, after temporarily clamping the pedicle of the heart by a Doyen clamp, the blades of which were covered by rubber tubing. The circulation was arrested up to about three minutes which was a sufficient time for the performance of the following operations.

1. Incision from without of the valvular ring with secondary suture.
2. Division and suture with fine silk of a pulmonary valve leaflet.
3. Exposure and cauterization of a valve leaflet, as might be desirable in ulcerative endocarditis.

Tumors of the Heart—These include lipomas, myxomas, sarcomas and carcinomas. The malignant tumors are usually secondary. Cysts, especially the parasitic echinococcic cysts, also involve the heart. Of seventy-seven cases of cardiac tumors collected by Karrenstein, thirty-eight were myxomas and twenty-seven involved the left heart. Secondary tumors more frequently involve the right heart than the left. Twenty-nine of the myxomas involved the tricuspid valve producing irregular obstructive symptoms that only surgical measures could relieve. A positive diagnosis has heretofore not been made during life. The symptoms include marked wasting, asthenia, marked dyspnea, fainting attacks, arrythmia, increased area of cardiac dullness, irregularities of the skiagraphic shadow and certain peculiarities in the polygraphic tracings. The graphic record of the esophageal pulsations is important. With modern methods of diagnosis it should now be posible to recognize certain of these tumors and give the patient the benefit of surgical relief.

Pulmonary Embolism—Trendelenberg has pointed out that between the time of formation of a pulmonary embolism and death about a quarter of an hour usually intervenes, and that this is sufficient in the well prepared clinic for the operative removal of the clot. The symptoms are sudden dyspnea, fainting, cyanosis and collapse, usually occurring during the convalescence from an abdominal operation.

The method of operating is as follows:

1. Dry shaving of the skin and disinfection by tincture of iodine.

2. The skin incision is carried along the left sternal edge from first to third rib, and from this a horizontal incision is made along the second rib. The skin and muscle flap is raised with a resection of the second and at times the third rib to a point well beyond the costo-chondral junction. Avoiding the internal mammary vessels, the pericardium is opened through the pleura in front of the phrenic nerve which is to be avoided.

3. A rigid knobbed hook is curved around the aortic and pulmonary artery, a strong rubber tube affixed and instrument withdrawn, leaving the rubber in place.

4. By the rubber tube both vessels are pulled forward and controlled. The visceral layer of pericardium and fat over the pulmonary vessels are excised, so the vessel cannot later slip back into its serous covering.

5. Through an incision in the axis of the pulmonary artery two-fifths of an inch long, a fine curved dressing or polypus forceps is introduced into the branches of the pulmonary artery and the clots extracted. The aorta and pulmonary artery must not be constricted over three-quarters of a minute. If uncertain as to complete removal of all clots, the incision should be temporarily closed with a special narrow clamp, the constriction relieved and later the procedure repeated. In suturing a small forceps springing outward and having a small hook projecting outward at each tip is introduced between the ends of the slit, the vessel drawn forward and a flat hemostatic clamp is so applied behind the forceps that the edges of the incision project a little between the branches of the forceps. The blood stream then travels behind the occluded slit and the latter may be quickly closed by interrupted silk stitches. The removal of blood from the pericardium and suture of external parts without drainage completes the operation.

In about fifteen cases no recovery has as yet followed this operation, but in one case the patient survived to the fourth day.

Aortic Aneurism—We are rapidly approaching the time when methods of direct surgical attack will be considered in most cases of thoracic aneurism. It is now possible to reduce the blood pressure within the sac, while the walls of the sac may be infolded or reinforced from without or within, and even a ruptured sac has been closed by suture. Tuffier (*Bull. ev Mein de la soc de chir.* 1907 *No.* 14, *U. S. XXXIII,* 406) found it possible to pinch the sac of an aneurism with pressure forceps and narrow the lumen with a double suture. Kummell (*Chirurgie des Aortenaneurysmas, Deutsche Med. Wchnschr Leipz U. Berl.* 1914 *XL,* 731) in a desperate case attacked a ruptured aneurism of the lower thoracic aorta, by resecting the ribs extra-pleuraly, reduced the calibre of the vessel to the normal size and closed the opening by suture. The circulation of the legs was restored, the patient dying later.

Experimentally it has been found possible to reinforce the aorta by sewing about it strips of prepared aorta, or to reduce the blood pressure by encircling the vessel with thin aluminum bands, as used by Halstead and Gatsch (*Jour. Amer. Med. Asso.* Dec. 29, 1906, No. 26).

Henschen of Zurich experimentally has used broad strips of costal fascia to strengthen the vessel wall and also tubes of galatholith, introduced within the vessel to support its wall.

Jeger has (*Beitz. z. klin. Chir.* 1914, 641) even considered the operative exclusion of the arch of the aorta.

Ligation of the branches of the Pulmonary Artery was suggested before the third international congress at Brussells, September, 1911, by Sauerbruch for bronchiectasis. This has been done from without the pericardium and experimentally from within the pericardium by Willy Meyer (*Trans. of Amer. Surg. Asso.* 1913). In one dog killed ten weeks after operation the right pulmonary artery was firmly closed by the ligature, the upper and middle pulmonary lobes were tightly adherent to costal pleura, and there was a marked increase in connective tissue in two upper lobes. Three operations for bronchiectasis by ligation of pulmonary branches, by Meyer were followed by marked improvement. In animals the main trunk of the left and right pulmonary artery may be ligated without harm, the left branch is accessible within the pericardium, the right less so.

Unquestionably there is a rapidly widening field for the surgical relief of forms of cardiac disease hitherto considered beyond the resources of the art. Are our internists prepared to take advantage of it?

DISCUSSION.

Dr. Barnes said that as many of these cases die from death of the brain cells, is it not possible that collateral circulation might be kept up by hooking up the vessels of the neck or arm of the patient with a donor? This would maintain the circulation in the brain and so prevent death of the brain cells.

Dr. Morris said that is a good idea of Dr. Barnes. We might try it and call it the Barnes Operation. However, why would it not be possible to use a collapsible rubber ball and connect up an artery and vein of the patient and so keep up the circulation in the brain?

Dr. Babcock, closing the discussion, said that the suggestion of Dr. Barnes is a good one. The cortical cells will live if there is any blood at all going to the brain. This way of keeping up the circulation is a good idea and it may be possible that we can work it out. We know that the heart has continued to beat long after the patient has stopped breathing.

RM
1
A4
1915
Biological
& Medical
Serials

American Therapeutic
Society
Transactions

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

STORAGE